

**TOWN OF HARVARD
CONSERVATION COMMISSION AGENDA
THURSDAY FEBRUARY 1, 2024 @7:00PM**

Pursuant to Chapter 2 of the Acts of 2023, an Act Making Appropriations for the Fiscal Year 2023 to Provide for Supplementing Certain Existing Appropriations and for Certain Other Activities and Projects, and signed into law on March 29, 2023, this meeting will be conducted via remote participation. Interested individuals can listen in and participate by phone and/or online by following the link and phone number below

UpperTH ProWebinar is inviting you to a scheduled Zoom meeting.

Topic: Conservation Commission

Time: Feb 1, 2024 07:00 PM Eastern Time (US and Canada) Join Zoom Meeting

<https://us02web.zoom.us/j/89881832915?pwd=bktvUTh0VFFaRUUpOdW5xbmwrQWw5QT09>

Meeting ID: 898 8183 2915

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Public Hearings:

7:05pm **Request to Amend the Order of Conditions Hearing - Bare Hill Pond Watershed Management Committee, DEP#177-726, Harvard#0523-03**, to limit the Order to three years and set the start date of the annual draw down of Bare Hill Pond as October 1st.

7:10pm **Notice of Intent Hearing – Shakers’ Quarry Property Owner’s Association, Inc., Stonecutters Path and Quarry Lane**, for the grinding and removal of existing asphalt, repairs to gravel base, and resurfacing the roadways, and the replacement of an 18” culvert and reforming portions of the existing open channel drainage system within the 100’ wetland buffer zone- **Waiver Requested**

7:40pm **Continuation of a Notice of Intent Hearing – Travis Dery, 62 Old Littleton Road, DEP#177-729, Harvard#1023-01**, for the installation of a pool within the 100’ wetland buffer zone

8:00pm **Continuation of a Notice of Intent Hearing – Juno Construction LLC, Ayer & Old Mill Roads, (Map 4 Parcels 52, 52.1, 52.2 & 53), DEP#177-33, Harvard#0923-01**, for the construction of one duplex unit, deck, drainage, public water supply wells, tree clearing, grading and associated utilities within the 100’ wetland buffer zone and the 200’ riverfront area

New Business:

1. Act on Bare Hill Pond Watershed Management Committee Community Preservation Committee Application - VFD Drive Capital Purchase
2. Act on Harvard Conservation Trust Request for New Moon Walk at Barba’s Point, February 9, 2024
3. Allocation of Funding for the MACC Annual Environmental Conference, March 2, 2024
4. Request for Judges for the 2024 Science Fair, March 24, 2024 1:30pm – 3:30pm

Old Business:

1. Zoning Board of Appeal Peer Review of Craftsman Village Harvard – Review & Comments
2. Review Craftsman Village Harvard Plan to Manage Invasive Plants
3. Update on Wetland Violation at 351 Ayer Road
4. Status Report Pine Hill Village, DEP#177-586
5. Status Report 90 Warren Ave, DEP#177-719, Harvard#1122-02

The listing of matters are those reasonably anticipated by the chair which may be discussed at the meeting. Not all items listed may in fact be discussed and other items not listed may also be brought up for discussion to the extent permitted by law.

Standard Business:

1. Updates from Representatives & Liaison
2. Approve Minutes
3. Approve Invoices

NEXT MEETING: FEBRUARY 15, 2024

AS



Community Preservation Committee – Town of Harvard Request for Funding for FY2025

APPLICANT:

Your Organization: Bare Hill Pond Watershed Management Committee

Application Date: January 24, 2024

Contact Name: Bruce A. Leicher, Chair

Phone No.: 617.417.0892

Email:

PROJECT:

Project Title: VFD Drive Capital Purchase Requested Amount: \$50,000

Purpose (Check all that apply):

- X Open Space [] Historic Preservation [] Affordable Housing X Recreation

Summary Description of Project:

The Bare Hill Pond Watershed Management Committee has a 20 year program that has successfully controlled phosphorous and managed invasive species in the Pond for over 20 years by conducting annual winter pumped draw downs. There is extensive data from monitoring demonstrating the restoration of native species and habitat, the protection of amphibians reptiles, crustaceans and birds and mammals. The work is carefully regulated by the Conservation Commission and supported by the Conservation Commission. The electrical control drive for the pump has failed after 17 years. It had an expected useful life of 10 years and with proper maintenance lasted longer but no longer can be repaired and a capital purchase is required. It is expected to cost \$40-100,000 to purchase a new VFD drive and to program and install it. The failure occurred as this year's draw down was planned, and budget was requested from the Town but due to the current Town budget deficit was not accepted, and the Committee was asked to submit an out of cycle request to CPC for this Spring Town meeting.

- [] Has a copy of this application been submitted to the Harvard Climate Initiative Committee to assess its climate impact? It is being furnished in parallel to the Committee

Please note whether the project has been endorsed by any of the following:

- [] Harvard Conservation Commission (Open Space Projects) The committee strongly supported the issuance of the permit and to the DEP when the application for the permit (Order of Conditions) was reviewed by DEP.
- [] Harvard Historical Commission (Historic Preservation Projects)
- [] Harvard Municipal Affordable Housing Trust (Affordable Housing Projects)

Parks & Recreation Commission (Recreation Projects) - The Park and Recreation Committee is being informed in parallel and is supportive based on a conversation this week.

How will this project benefit the community?

Bare Hill Pond is a vital natural resource that is subject to in lake phosphorous loading and invasive aquatic plants. It is also at risk of algal blooms. By conducting pumped draw downs phosphorous in the water column has been reduced by 50%, which significantly reduces the risk of algal blooms, as documented by monitoring data. The years in which algal blooms occurred were years when the pump drive or parts failed and the draw down was not complete. Before those years and in the 2 years since they were avoided. The growth on invasive species has been successfully managed in many areas of the Pond by the draw downs over the last 20 years. This past summer, when the draw down was aborted prior to the January freeze due to the pump failure, the control of plants was unsuccessful and was much worse than prior years. We need to get the pump working for next year to make the Pond available to the Community as in prior years for open spac and recreation. A copy of the 2023 Annual Report on the Draw Down is attached.

Other possible approaches are prohibitively expensive or less desirable to the Community. Dredging or herbicides doe not control phosphorous or algal bloom risk, only plants. Dredging in the 10's of millions of dollars and herbicides over \$1MM if the Community were to consider it. The annual operating budget for the draw down program is approximately \$35K per year and is highly cost effective.

Total Project Cost: \$50,000-100000

If this is larger than the request, please note other funding

sources: Do you have any other funds available? If so, can they be used for this project? Why or why not?

The Committee has reserves of approximately \$40,000 for one time maintenance and repairs of the pump of which up to one half could be prudently used to pay for this project. It is important to have funds immediately available each year for repairs that occur during a draw down so that it can be fixed when possible immediately and not lose the benefit of each year's operating expenses. Most of the time the pump and its components can be repaired for \$3-5K and the draw down is not impacted. These funds remain from the original DEP 319 grant for this purpose.

The existing vendor provided an informal estimate of \$40,000 for this project but this project requires an RFP and they will be submitting a formal bid in response along with other potential vendors. An RFI was issued to a list of potential vendors and one vendor has estimated the project as high as \$100,000. This makes it a bit uncertain where the final bids will come in.

The Committee plans to apply for an MVP grant in March which requires a 25% match. This is a project that fits its criteria, except the timing of the grant award may be too late for it to qualify for funds. The MVP grant administrator is seeing what is possible. While grant awards are expected to be announced in May, the contract and award is expected in August and September and the VFD drive might have a 3-5 month order lead time requiring an expenditure before August, and it needs to be installed in September. It is not clear how much of the expenditures can be delayed until August.

The Committee also plans to apply for a Nashua River Watershed Association Grant of \$7500 for control of invasive species.

To the extent grant funding is otherwise available, then the Committee will return that amount of any grant under this \$50,000 request. In addition, to the extent that the Committee's reserve funds can be utilized up to \$20,000, the Committee will use such funds before using CPC funding.

Please submit this form electronically, along with any supporting documents you wish to attach, by 4:00 PM on Friday, September 22, 2023 to Julie Doucet in the Harvard Select Board office at jdoucet@harvard-ma.gov.

Thank you for helping to preserve our community!

Below is a picture of the VPD drive and the pump it powers:





Report For:

Town of Harvard
Bare Hill Pond Watershed Management Committee
Harvard Massachusetts

Bare Hill Pond In-Lake Water Quality and Plant Survey - 2023



Prepared by:
Aquatic Restoration Consulting, LLC
18 Sunset Drive
Ashburnham, MA 01430

August 2023

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Introduction

Aquatic Restoration Consulting, LLC (ARC) performed in-lake water quality monitoring and an aquatic plant survey within Bare Hill Pond in 2023. The intent of these surveys was to document 2023 summer conditions and compare these data to previous years, identifying any trends or concerns. This year we continued the expanded water quality monitoring program that was implemented in 2022. The expanded program adds the months of April, August, September, and October and three monitoring stations. The intent of the monitoring program expansion is to record temperature and dissolved oxygen depth profiles and measure phosphorus concentrations near the sediment during multiple seasons. We will utilize these data to evaluate the potential of phosphorus loading from sediments, which may be fueling the recent algal blooms, experienced in 2020 and 2021. Not all date and stations are sampled. The decision to include/exclude is made by scientist based on prior data. For example, the scientist may skip the October sampling if the lake has already undergone destratification and is in a completely mixed state.

The Bare Hill Pond Watershed Committee (Committee) has conducted winter water level drawdowns periodically since 2002. Early drawdowns were limited to the depth of the outlet (3.5-foot drawdown) but the installation of a pump system enables the Committee to increase the drawdown depth. Substantial reductions in plant cover and density were observed in association with initial extended water level drawdowns and these conditions have remained consistent following subsequent drawdowns. A shift in species dominance from tall growing vegetative propagators (spread through fragmentation or by rhizomes) to low growing seed producers was observed. A history of drawdown depth and summary of conditions reported by the Committee is provided in Table 1.

Given that non-native species growth regains community dominance in shallow water following cessation of winter water level drawdown¹ and the potential benefit of improved flushing (removing accumulated phosphorus), the Committee wishes to continue the drawdown program for nuisance aquatic plant management. This report summarizes data collected in 2023 and provides a comparison over several years, with an emphasis on the comparison within the last five years.

¹ see comparison of 2014 data vs data post drawdown in prior reports (<https://www.harvard.ma.us/bare-hill-pond-watershed-management/pages/annual-other-reports>)

Table 1. History of Bare Hill Pond Winter Drawdowns.

Winter Season	Water Level Reduction and Summary of Following Growing Season Observations
2002-03	1.5 Feet
2003-04	3.5' gravity drawdown
2004-05	3.5' gravity drawdown
2005-06	3.5' gravity drawdown. These first few created evidence of efficacy in drawdown zone and no evidence of substantial issues
2006-07	5' gravity and pump drawdown. Some increase in efficacy
2007-08	5' gravity and pump drawdown. Good freeze and improvement
2008-09	3.5' gravity drawdown. Per request to see if a year off pumping would work - limited efficacy and rebound in plants
2009-10	6' gravity and pump drawdown. Planning started for beach excavation and the storm water rain gardens
2010-11	6.5' gravity and pump drawdown. Continued incremental efficacy and no harm detected
2011-12	7' gravity and pump drawdown. More efficacy and depth needed for the beach excavation project
2012-13	6' gravity and pump drawdown. Backed off partway through process to see if efficacy could be maintained
2013-14	No drawdown. Year off to see if lower frequency worked - phosphorous stable, some re-emergence in spots
2014-15	5.5' drawdown. Heavy snowfall runoff - phosphorous increase and increased observance of invasives by residents in 5 – 8 foot zone but overall reduction in plant volume and at transect sites
2015-16	6.0' drawdown. Very mild winter with an extended warm, dry and sunny growing season following
2016-17	5.75' drawdown. Very mild winter, even warmer than previous year. Wet spring and summer; water level higher than past years
2017-18	6' drawdown. Cold long winter with freezing temperatures into April. Period of hot humid weather leading to a pattern of extended wet weather. Water levels remained high throughout the summer.
2018-19	4.5' drawdown. While 6' was the goal, it was difficult to achieve the desired drawdown depth due to precipitation. The early portion of the summer was wet and overcast but come July it was warm and dry.
2019-20	6.0' drawdown. Warm November and March. Very low precipitation/snow cover
2020-21	Attempted 6.5'. Equipment issues prevented holding that depth beyond November. Lake was about 3.0' down during a short period of freezing
2021-22	6.5' drawdown. This season was typical in terms of temperatures and precipitation for most months except November which was below average. Snowpack was slightly below normal.
2022-23	7.5' due to operator error; Corrective actions were taken in as discussed with the Conservation Commission. Warmer & wetter winter.

Influence of Weather

Ideal conditions for a winter water level drawdown to control rooted plants is a consistent cold winter (consecutive days below freezing) with little rain or snow. Snow insulates the ground preventing the hard freeze necessary to kill plant roots. Looking at the historic weather conditions recorded at Fitchburg Airport since 2009 during the Nov 15 through Mar 15 winter season, the winters of 2013-2014 and 2014-2015 had the lowest average minimum temperatures (18.0 and 17.2°F, respectively) (Figure 1). The number of days when the low temperature fell below 30°F was 102 during 2013-2014, representing 84% of the days during the period of analysis; similarly, 92 days experienced low temperatures below 30°F in 2014-2015 representing 76% of the time (Figure 2). The next two winters were milder with average lows in mid-20 degrees with fewer days below 30°F. 2017-2018 and 2018-2019 were cold years with 98 and 95 days with low temperatures (81% and 79% of the days) with an average low of 19.5 and 20.2°F, respectively. From the winters of 2019-2020 through 2023 the number of days below 30°F averaged 86. Average low temperature for the same period was 24.4°F, 1.7°F warmer than the average low since 2009. The number of low temperatures days were evenly distributed between December, January and February. The 2022-2023 drawdown period was wet with just under 19 inches of precipitation at the Fitchburg airport, like 2009-2010 and 2020-2021 (Figure 3).

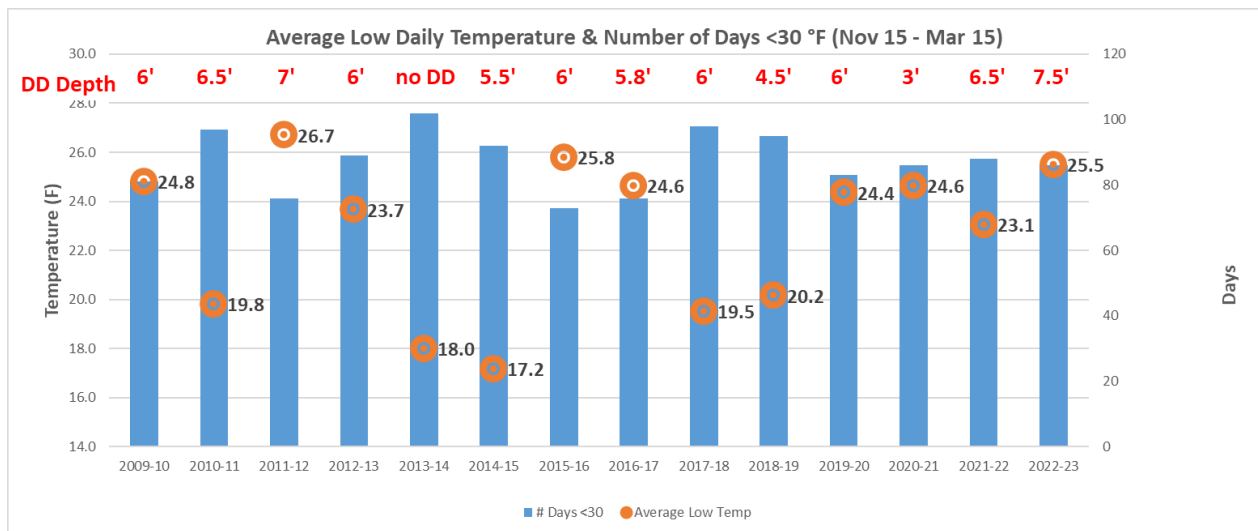


Figure 1. Average Low Air Temperature and Number of Days below 30°F during the Winter Season.

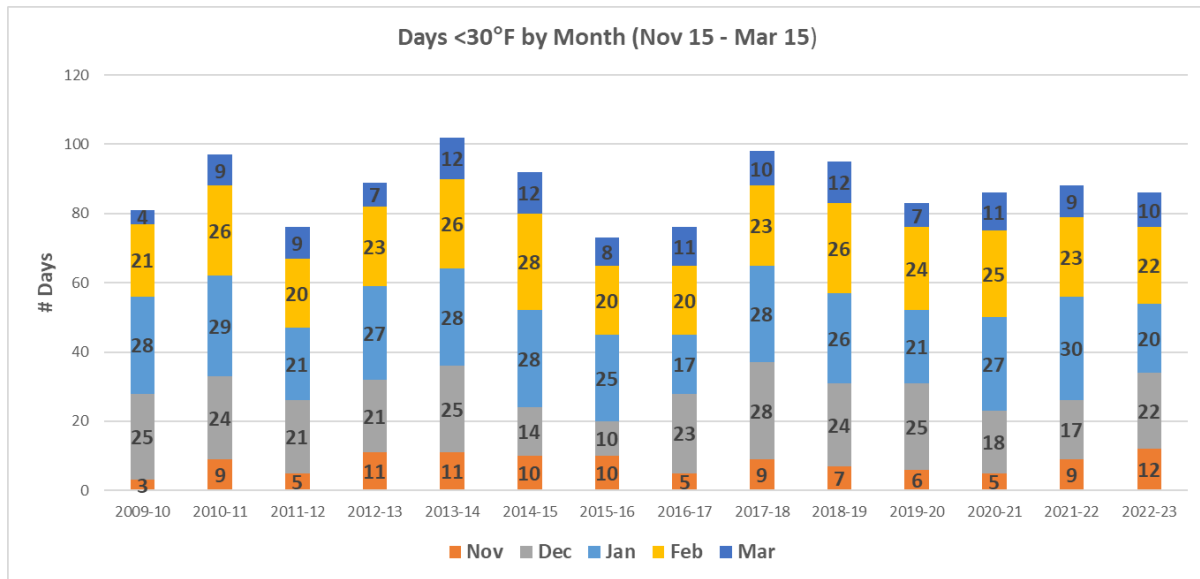


Figure 2. Number of Days with Air Temperatures below 30°F during the Winter Season.

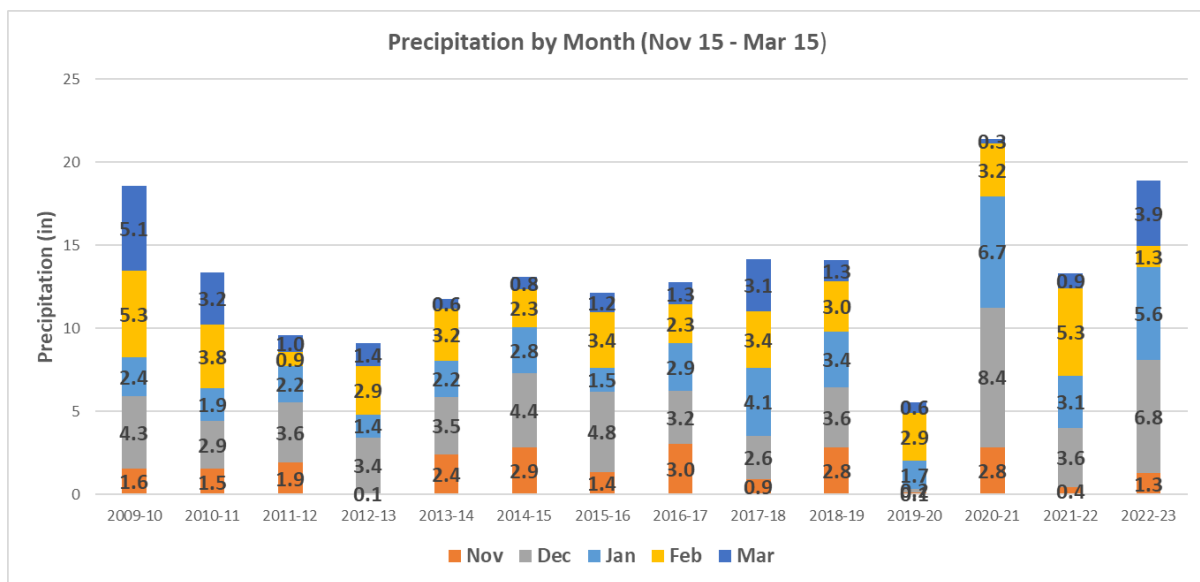


Figure 3. Precipitation during the Winter Season

In-Lake Sampling

In-lake sampling was conducted at five stations (Figure 4) on May 30, June 29, July 20 and August 13, 2023 (September & October sampling not yet scheduled). ARC used the same sampling methods as prior surveys for data collection consistency (see prior reports for methodology). In-situ water depth profile measurements of temperature, dissolved oxygen (DO), and specific conductivity were recorded at all five locations. ARC collected samples for total phosphorus (TP), dissolved phosphorus (DP) and total suspended solids (TSS) at the surface and approximately 0.5 feet above the sediment water interface (bottom) at BHP-2, at the surface at BHP-1 and TP at the bottom at stations BHP-3, 4 & 5.

Five sample locations (Figure 4):

- BHP-1 shallow basin in the south
- BHP-2 deep hole in the north/main basin BHP-2
- BHP-3 between BH-1 & BHP-2 south of Ministers Island
- BHP-4 south of Sheep, east of Spectacle Islands
- BHP-5 southeast of BHP-1 between Sheep and Four Acre Islands

The temperature and DO profiles suggest that the lake was weakly thermally stratified in May. DO concentrations have declined substantially since 2010. The hypoxic (low oxygen) layer is expanding and resulting in less desirable habitat for aquatic biota. Waters below ten feet were historically below the 5.0 mg/L threshold considered to support aquatic life, but data recorded since 2022 suggest that supportive waters are limited to about eight feet. This condition also facilitates the release of phosphorus from sediments, resulting in ideal conditions (warm water and plenty of phosphorus) for cyanobacteria blooms. The lake was anoxic (<2 mg/L oxygen) at a depth of 10 feet in 2021 and 2023 vs 12-14 feet in the past (Table 2, Figures 5 & 6). The anoxic layer was slightly reduced come August with anoxia starting at about 12 feet. DO at the added stations also exhibited anoxia at ten feet in July 2023. These conditions allow phosphorus release from iron in the sediments. The lake typically regains oxygen in the hypolimnion after mid-September when fall turnover (mixing) occurs.

Table 2 provides depth profile data through August 13, 2023. Figures 5 & 6 provide a graphical representation of temperature and DO data for the deep station (BHP-2) in comparison with the last five years.

Lake pH ranges from slightly acidic [<7 standard units (SU)] to basic (>7 SU). Higher pH values (>8.0 SU) are likely due to primary productivity when plants (macrophytes and/or phytoplankton) are photosynthesizing. During this process, carbon dioxide is removed from the water raising the pH of water. Lake water pH is typically the highest in the afternoon.

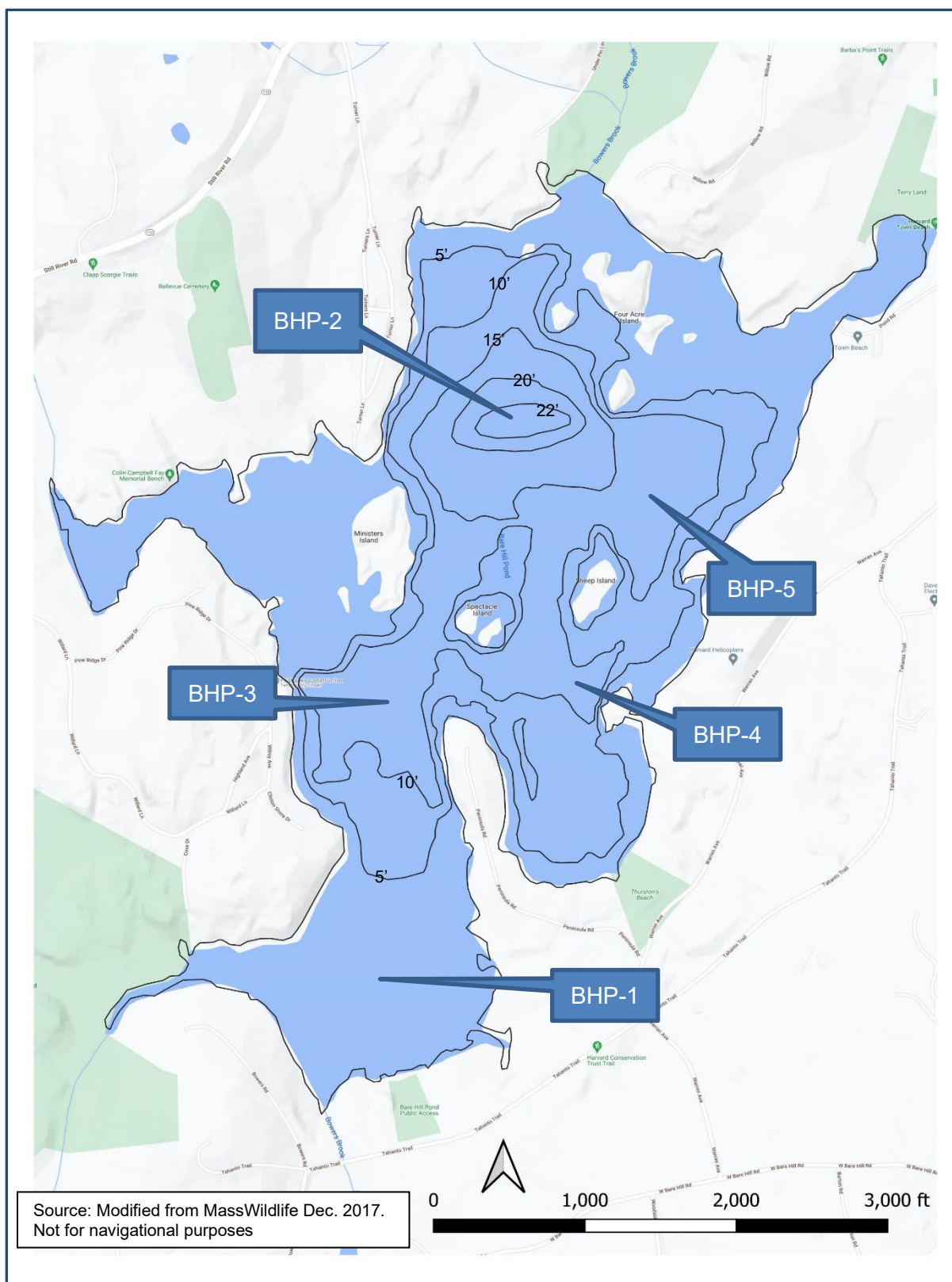


Figure 4. Bare Hill Pond Monitoring Stations.

Table 2. Bare Hill Pond Water Depth Profiles 2023.

BHP-1						BHP-1					
May 30, 2023						June 29, 2023					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	22.41	9.23	7.2	222	0.4	0	27.07	8.15	7.0	212	2.0
1	22.45	9.19	7.2	222	0.6	1	27.07	8.12	7.0	212	1.5
2	22.00	9.01	7.2	220	0.8	2	27.05	8.20	7.0	213	1.6
3	21.58	9.17	7.2	221	1.0	3	25.22	8.25	7.0	216	1.8
4	21.61	9.20	7.2	221	1.2	4	24.78	7.45	6.7	213	2.0
5	21.59	9.19	7.2	221	15.0	5	23.37	7.60	6.6	196	2.4
BHP-2						BHP-2					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	23.58	8.84	7.3	223	5.2	0	26.97	8.41	7.4	218	2.6
2	23.50	8.89	7.3	223	3.5	2	26.92	8.43	7.4	218	2.8
4	23.13	8.95	7.2	222	2.2	4	25.99	8.49	7.4	218	3.0
6	22.95	8.87	7.2	222	2.4	6	24.78	8.47	7.3	217	3.3
8	21.25	8.84	7.1	222	2.6	8	24.58	8.35	7.2	217	3.6
10	20.75	8.14	6.8	221	3.0	10	23.10	7.40	6.8	223	4.2
12	18.26	6.44	6.5	218	3.3	12	20.90	5.80	6.6	223	5.1
14	16.70	4.68	6.4	217	3.9	14	19.30	3.43	6.4	224	6.3
16	15.09	3.13	6.3	217	4.9	16	17.88	1.77	6.3	221	8.3
18	12.83	1.38	6.2	217	6.6	18	15.82	1.90	6.3	220	8.4
20	11.92	0.00	6.3	220	10.3	20	13.88	0.00	6.4	224	11.4
22.5	11.00	0.00	6.4	239	189.9	22	12.68	0.00	6.7	245	4.4
						23.5	11.74	0.00	6.8	263	19.4
BHP-3						BHP-3					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	22.43	9.00	7.2	223	1.8	0	27.30	8.39	7.2	217	1.4
2	22.48	8.97	7.2	222	1.8	2	26.62	8.50	7.2	217	1.4
4	22.43	8.99	7.2	222	1.9	4	25.73	8.53	7.2	217	1.4
6	21.52	8.97	7.1	222	1.9	6	24.54	8.32	7.0	216	1.5
8	21.08	8.66	7.0	222	1.9	8	24.18	7.61	6.8	212	1.5
10	19.06	7.50	6.7	219	2.0	10	23.86	6.59	6.6	212	1.7
12	18.73	7.03	6.6	219	2.2	12	20.74	4.55	6.4	224	3.0
						13.5	20.09	2.44	6.4	226	13.2
BHP-4						BHP-4					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	22.11	9.11	7.3	222	1.7	0	27.30	8.50	7.4	221	0.9
2	22.14	9.05	7.2	222	1.7	2	26.69	8.57	7.4	219	0.9
4	22.10	9.06	7.2	222	1.8	4	25.53	8.78	7.3	217	1.0
6	21.65	9.00	7.1	222	1.8	6	24.76	8.56	7.2	217	1.1
8	21.13	8.78	7.0	221	1.9	8	24.58	8.42	7.1	218	1.2
10	20.74	8.10	6.8	222	2.2	10	23.45	7.66	6.8	224	1.3
11.5	18.71	7.76	6.8	218	84.5	12	21.15	6.52	6.6	224	1.7
						12.5	20.46	5.82	6.7	224	2.2
BHP-5						BHP-5					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	23.50	8.97	7.3	223	1.2	0	27.18	8.58	7.5	219	0.0
2	23.42	8.40	7.3	223	1.2	2	27.19	8.57	7.4	218	0.0
4	23.14	8.98	7.2	223	1.1	4	27.08	8.56	7.3	220	0.0
6	22.83	8.81	7.1	223	3.5	6	25.93	8.41	7.0	221	0.0
8	21.19	8.82	7.0	222	3.8	8	24.49	7.93	6.7	240	0.1
10	19.21	7.66	6.7	219	1.1	10	22.93	7.29	6.7	224	0.1
11.5	18.45	5.94	6.6	219	1.4	12	20.81	4.45	6.5	225	4.2

Table 2. Continued.

BHP-1						BHP-1					
July 20, 2023						August 13, 2023					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	29.18	8.60	7.3	202	1.2	0	25.07	7.80	6.6	198	1.0
1	28.46	8.60	7.2	201	1.2	1	25.07	7.84	6.6	198	1.4
2	28.30	8.52	7.0	200	1.1	2	24.99	7.86	6.6	198	2.1
3	27.73	7.33	6.6	196	1.3	3	24.35	8.21	6.7	200	2.4
4	26.81	6.06	6.4	190	1.8	4	23.79	7.15	6.4	199	2.5
5	26.11	7.84	6.6	187	1.5	5	23.42	4.43	6.0	198	2.4
BHP-2						BHP-2					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	30.41	8.17	7.4	205	2.2	0	26.61	8.96	7.9	204	3.6
2	30.41	8.25	7.3	205	2.4	2	26.60	8.88	7.8	203	3.6
4	28.09	8.37	7.2	202	2.9	4	26.33	8.93	7.7	203	3.7
6	27.35	7.80	6.9	201	3.8	6	25.91	8.68	7.3	203	3.6
8	26.10	3.86	6.2	184	4.6	8	25.35	7.12	6.9	202	3.8
10	23.55	0.55	6.2	215	4.8	10	23.99	2.54	6.3	205	4.1
12	21.09	0.00	6.3	226	5.0	12	22.44	0.10	6.4	213	5.0
14	19.45	0.00	6.3	226	5.2	14	20.08	0.10	6.6	242	3.9
16	17.74	0.00	6.2	234	5.7	16	17.83	0.10	6.6	246	3.0
18	16.10	0.00	6.4	216	5.6	18	15.78	0.10	6.6	256	2.8
20	14.23	0.00	6.7	243	4.1	20	13.68	0.10	6.9	275	5.7
22	12.63	0.00	7.0	277	9.0	22	12.66	0.10	7.0	318	5.9
23	12.25	0.00	7.0	288	14.5						
BHP-3						BHP-3					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	29.80	8.39	7.2	203	1.5	0	25.46	8.70	7.2	202	1.6
2	29.77	8.39	7.2	203	1.5	2	25.32	8.71	7.2	202	2.4
4	27.69	8.46	7.0	201	1.5	4	24.82	8.70	7.2	202	2.7
6	26.95	7.87	6.7	198	1.6	6	24.53	8.10	7.0	201	2.9
8	25.90	4.25	6.2	181	2.1	8	24.11	6.50	6.5	199	3.1
10	23.04	0.27	6.2	213	3.4	10	23.50	2.64	6.2	205	3.0
12	21.34	0.00	6.5	234	4.6	12	21.72	0.09	6.4	232	3.2
						12.5	21.45	0.10	6.4	232	4.6
BHP-4						BHP-4					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	29.86	8.26	7.0	205	1.2	0	25.98	8.85	7.5	203	3.5
2	28.46	8.42	7.2	205	1.3	2	25.46	8.77	7.3	203	3.6
4	27.61	8.32	7.1	205	1.4	4	24.83	8.68	7.2	203	3.6
6	27.21	7.39	6.8	203	1.6	6	24.61	8.52	7.1	203	3.6
8	26.22	4.38	6.3	192	1.8	8	24.33	6.96	6.6	202	3.3
10	23.94	0.29	6.1	212	3.7	10	23.86	3.65	6.3	203	3.0
12	21.79	0.00	6.5	231	5.2	11.5	22.69	0.09	6.3	212	3.7
BHP-5						BHP-5					
Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)	Depth (ft)	Temp (C)	DO (mg/L)	pH (SU)	Spec. Cond (us/cm)	Turbidity (NTU)
0	30.66	8.05	7.3	207	0.7	0	26.94	8.95	7.9	206	3.0
2	30.26	8.10	7.3	206	0.8	2	26.90	9.01	7.8	205	3.1
4	28.49	8.28	7.2	205	1.0	4	26.64	9.06	7.7	205	3.2
6	27.29	7.78	6.8	203	1.3	6	26.26	9.12	7.6	205	3.2
8	26.13	3.79	6.3	204	1.5	8	25.60	8.54	7.0	205	3.2
10	24.44	0.00	6.2	221	2.7	10	24.50	1.58	6.3	208	3.9
12	22.12	0.00	6.6	349	2.5	11.5	23.31	0.09	6.3	225	4.0

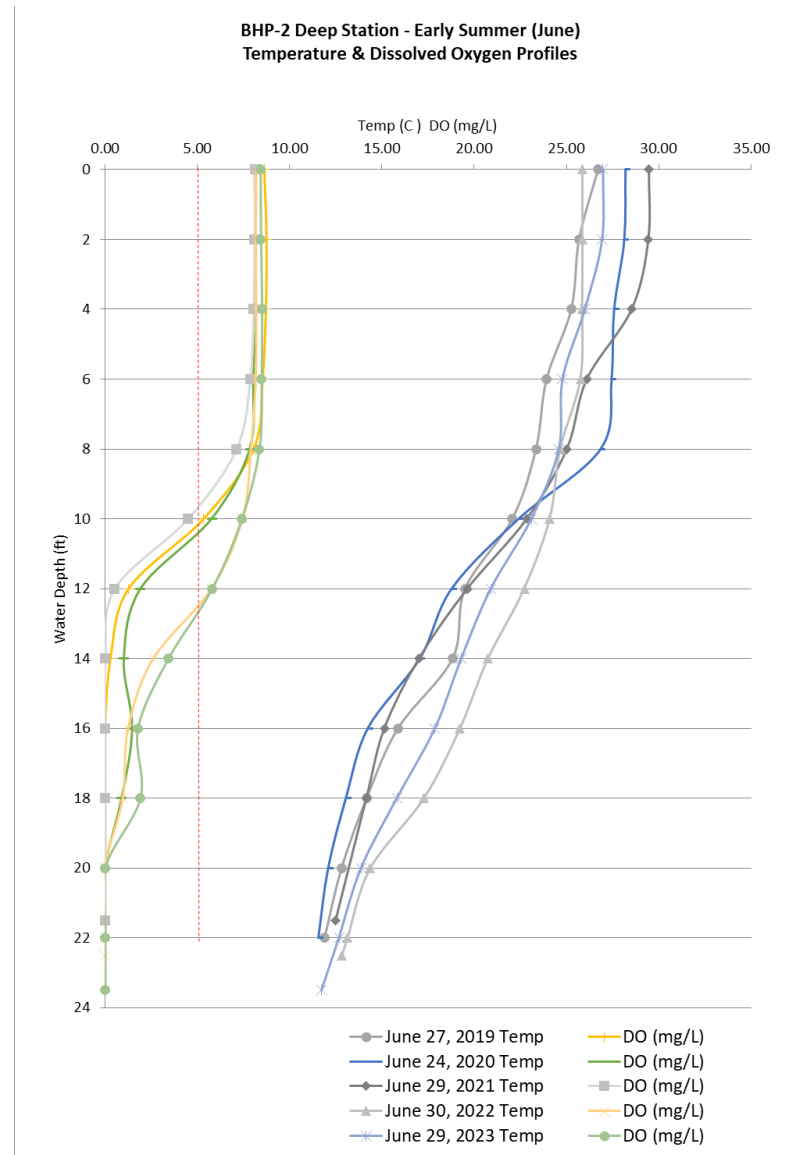
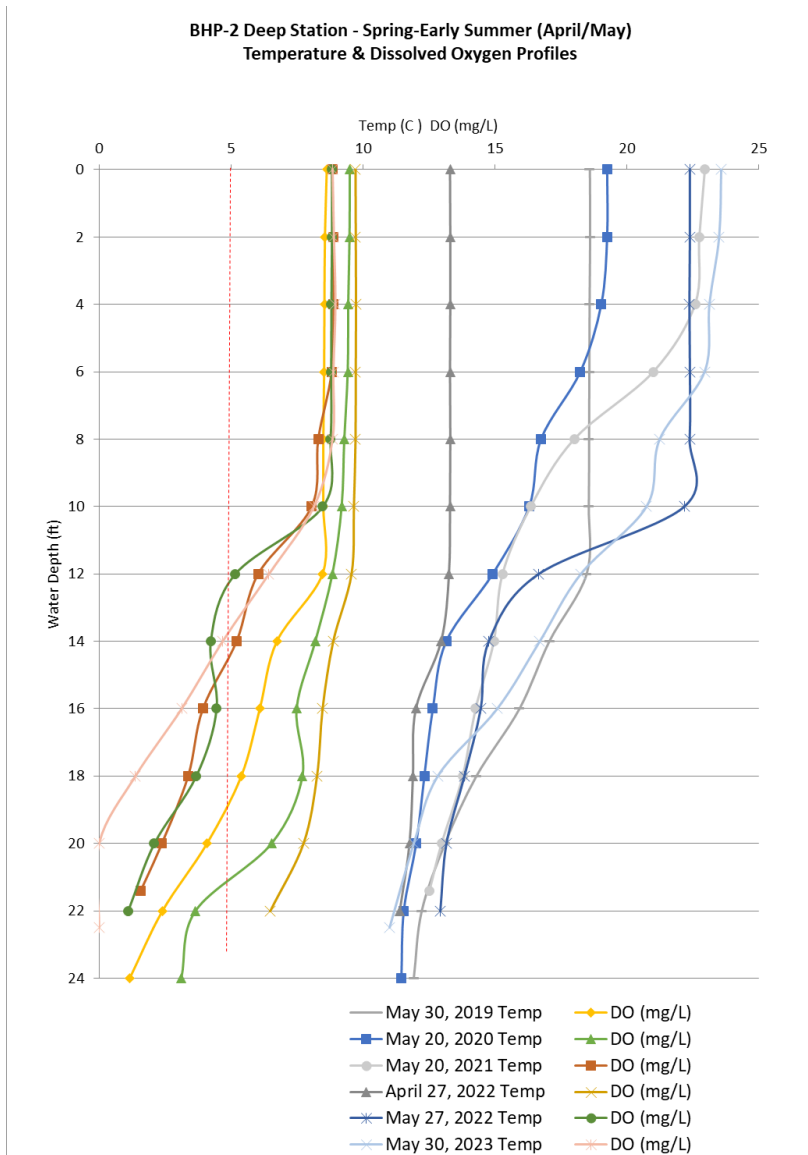


Figure 5. Temperature & Dissolved Oxygen Profiles at BHP-2 during Spring & Early Summer for 2019-2023.

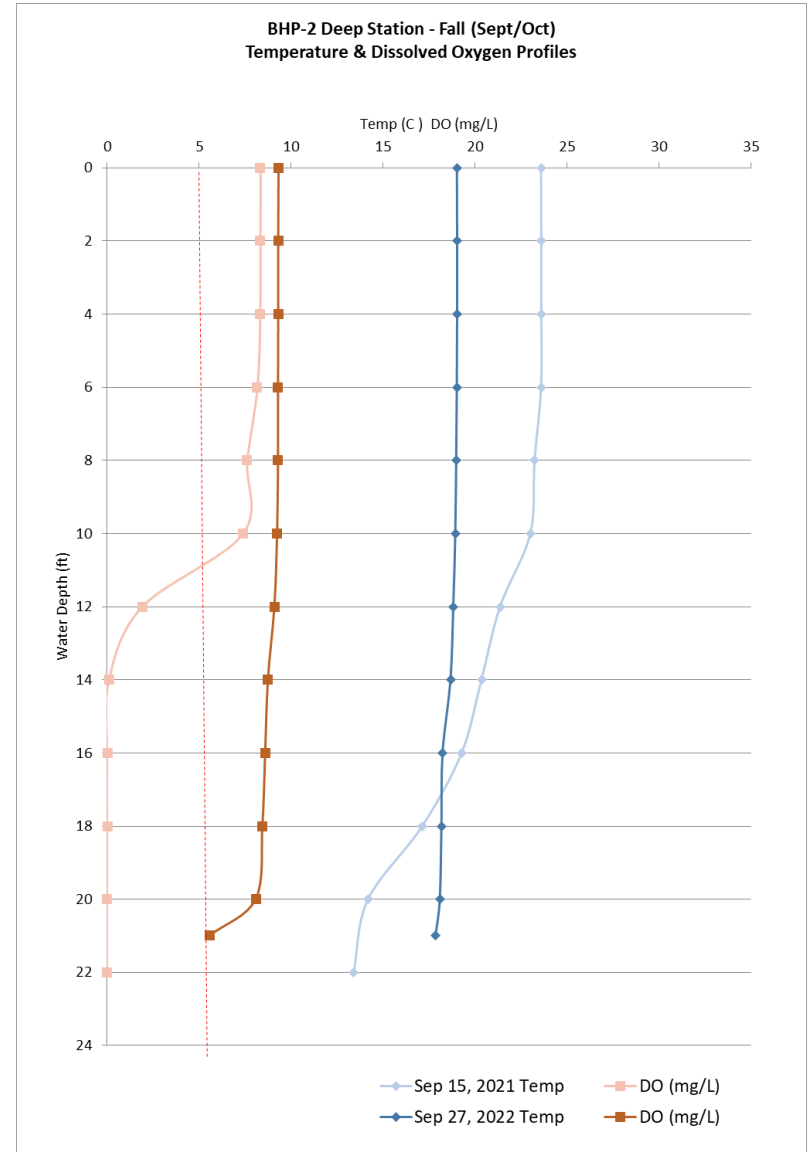
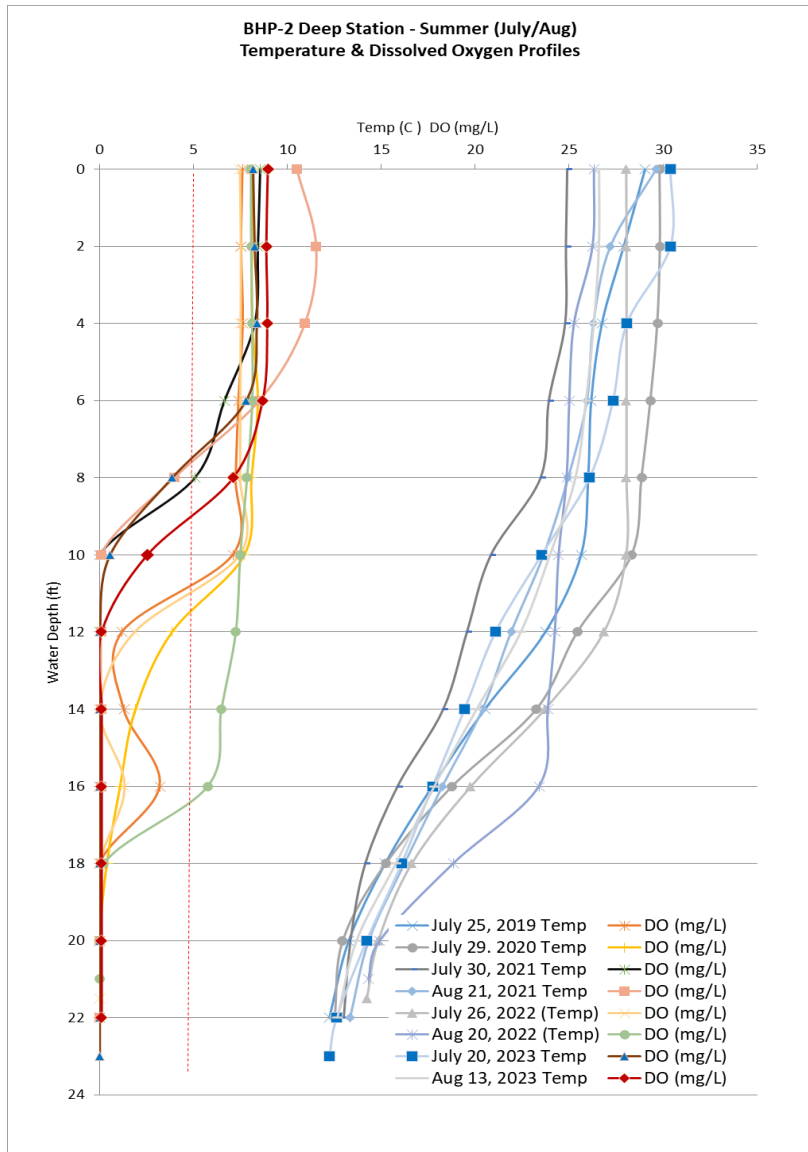


Figure 6. Temperature & Dissolved Oxygen Profiles at BHP-2 during Summer and Fall for 2019-2023.

Specific conductivity in 2023 was similar to prior years around lower 200's just over the desirable range threshold [<200 microsiemens per centimeter [$\mu\text{s}/\text{cm}$]]; values above 200 $\mu\text{s}/\text{cm}$ can be indicative of elevated dissolved pollutants and high productivity. It is common to have increased conductivity near the water-sediment interface where suspended solids increase conductivity. Surface and mid-depth values were comparable between stations.

Turbidity is measured in-situ with a probe. The probe sends a beam of light and the amount of light that is reflected back is used to calculate particle density in the water. The more light reflected, the more particles there are in the water. Turbidity was variable between July and August. It is not known if the elevated turbidity measurements were caused by phytoplankton, suspended solids and/or bubbles generated by boat traffic. TSS numbers were less than detection at all surface water samples. The highest TSS was recorded in the bottom sample in August.

Table 3 provides the results of phosphorus, TSS and water clarity (measured by Secchi disk transparency) during 2023. A comparison of phosphorus concentrations in the main basin (BHP-2) over time is illustrated graphically in Figure 7. TP surface concentrations were above the Massachusetts Department of Environmental Protection (MassDEP) target concentration of 0.030 mg/L^2 at the surface during June (BHP-2) and August (BHP-1).

Bottom water samples exceeded MassDEP's threshold at multiple location on multiple dates. This can be the result of suspended solids or phosphorus being released and/or accumulating in the hypolimnion. DP, the dissolved fraction of phosphorus, was detected in June and August suggesting that there is phosphorus that is readily available for algal uptake in both the surface and bottom waters. It should be noted that algal blooms were observed in 2020 and 2021, when TP values were generally below the MassDEP threshold suggesting that the threshold isn't low enough to be protective against blooms or the algae are obtaining their nutrients from bottom waters where TP and DP concentrations are greater.

The Town of Harvard Board of Health (BOH) fluorometer readings and estimated cyanobacteria cell counts were generally below the 70,000 cells/mL advisory threshold in 2023, except the samples collected at 12 and 20 feet in July 2023 (Figure 8).

² Bare Hill Pond Bare Hill Pond, Harvard, MA. TMDL Report MA81007-1999-001 July, 1999 Massachusetts Department of Environmental Protection https://www.harvard.ma.us/sites/harvardma/files/uploads/bhp_tmdl.pdf

Table 3. 2023 Bare Hill Pond In-lake Water Quality Data.

Station	Date	Time	TP (mg/L)	DP (mg/L)	TSS (mg/L)	Secchi (ft)	
BHP-2 Surface	5/30/2023	18:00	0.015	<0.010	<5	12	
BHP-2 Bottom	5/30/2023	18:10	0.013	<0.010	5		
BHP-1 Surface	5/30/2023	18:35	0.017	<0.010	<5	5.2	bottom
BHP-3 Bottom	5/30/2023	18:40	0.020			12.1	
BHP-4 Bottom	5/30/2023	18:50	0.021			11.3	
BHP-5 Bottom	5/30/2023	19:00	0.022			11.8	
BHP-2 Surface	6/29/2023	16:30	0.053	<0.010	<5	11	
BHP-2 Bottom	6/29/2023	16:35	0.060	0.034	7		
BHP-1 Surface	6/29/2023	16:15	<0.010	<0.010	<5	5.5	bottom
BHP-3 Bottom	6/29/2023	17:05	0.047			10.3	
BHP-4 Bottom	6/29/2023	17:15	0.038			12.1	
BHP-5 Bottom	6/29/2023	17:40	0.042			11.4	
BHP-2 Surface	7/20/2023	17:15	<0.010	<0.010	<5	7.8	
BHP-2 Bottom	7/20/2023	17:20	0.043	<0.010	<5		
BHP-1 Surface	7/20/2023	17:40	0.012	<0.010	<5	5.5	bottom
BHP-3 Bottom	7/20/2023	17:50	0.011			8.2	
BHP-4 Bottom	7/20/2023	18:00	0.011			8.5	
BHP-5 Bottom	7/20/2023	18:10	<0.010			9.6	
BHP-2 Surface	7/26/2022	18:50	<0.010	<0.010	5	7.7	
BHP-2 Bottom	7/26/2022	18:55	0.015	<0.010	12		
BHP-1 Surface	7/26/2022	19:15	<0.010	<0.010	5	4.0	bottom
BHP-3 Bottom	7/26/2022	19:20	<0.010			7.5	
BHP-4 Bottom	7/26/2022	19:38	0.013			8.1	
BHP-5 Bottom	7/26/2022	19:50	<0.010			8.4	
BHP-2 Surface	8/13/2023	13:10	0.026	<0.010	5	6	
BHP-2 Bottom	8/13/2023	13:20	0.104	0.028	7		
BHP-1 Surface	8/13/2023	11:05	0.062	0.039	<5	5.0	bottom
BHP-3 Bottom	8/13/2023	11:30	0.028			6	
BHP-4 Bottom	8/13/2023	12:10	0.042			6.2	
BHP-5 Bottom	8/13/2023	14:30	0.031			6.6	

"Bottom" indicates the Secchi disk reached the pond bottom
 Red shade – exceeded MassDEP recommended phosphorus threshold

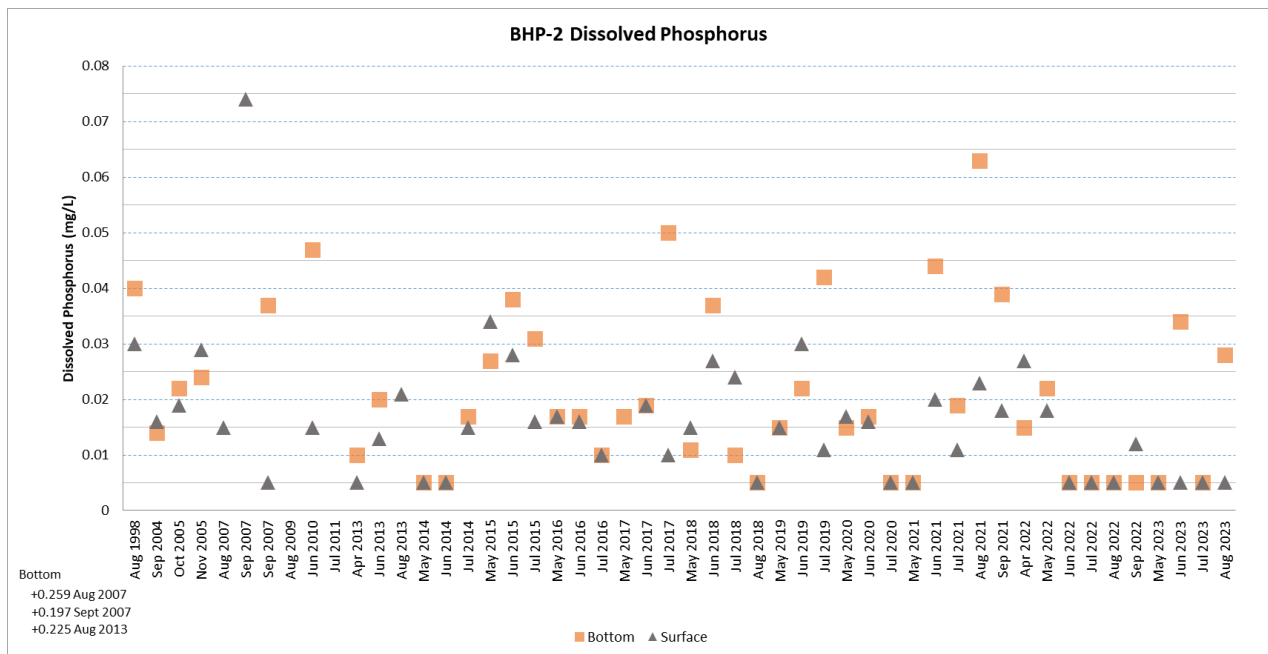
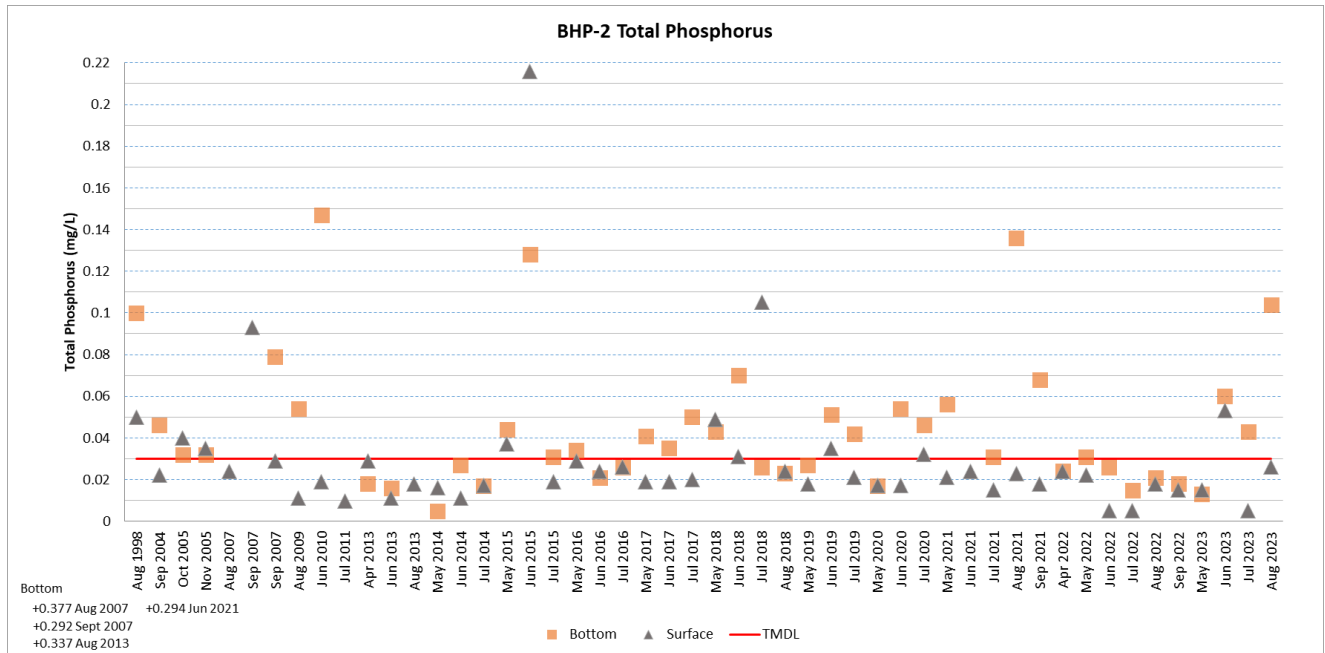
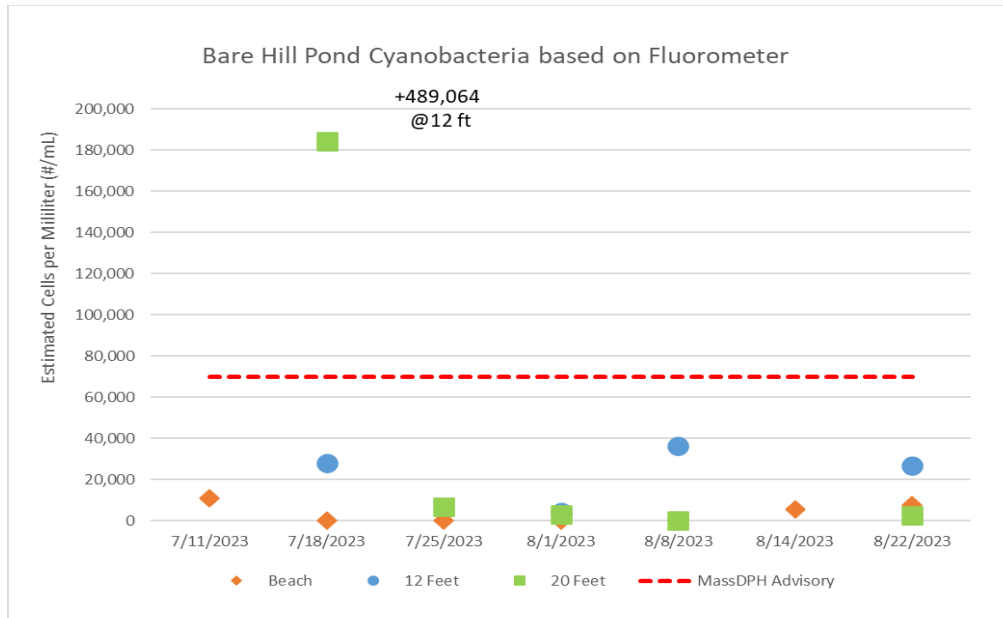


Figure 7. BHP-2 Total and Dissolved Phosphorus Concentrations.



Data provided by Town of Harvard Board of Health

Figure 8. Estimate Cyanobacteria Cells.

Secchi disk transparency (SDT) in 2023 was much improved from 2021 due to the absence of an algal bloom. SDT ranged from 6.0 to 12.1 feet (range in 2021 was 3.0 to 12.4 feet). The lowest values were recorded in August. Clarity was above the MassDEP State Water Quality Standard for swimming (4 feet; Figure 9) during all monitoring events (through August 13, 2023). Clarity was greatest in May.

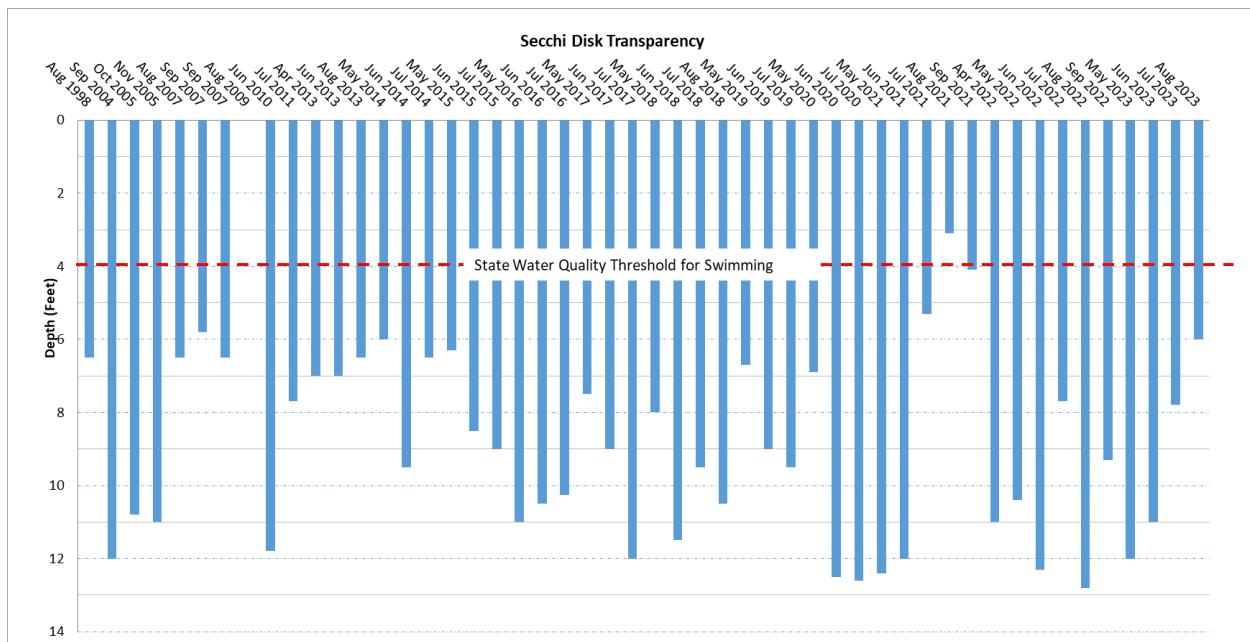


Figure 9. Bare Hill Pond (BHP-2) Secchi Disk Transparency.

In-lake Plant Survey

ARC conducted a plant survey on August 13, 2023. We used the same methods employed during the previous surveys conducted since 1998. ARC mapped pond aquatic vegetation along the five transects (A through E) established in 1998. We also repeated the eight points added in 2016 (F through I). Each transect was divided into a series of observation points and were located using Global Positioning System (GPS). A total of 60 points were assessed during the survey.

The plant survey focused on macroscopic fully submerged (e.g., milfoil), floating-leaved (e.g., pond lily), and/or free-floating plants (e.g., duckweed). At each transect point, we recorded the percent cover of all plants, the percent biovolume (as measured by the amount of the water column filled with plants) using a semi-quantitative (0-4) ranking system. Species observed in each transect were identified and assigned a relative density based on all species present (Table 4). Water depth was also recorded at each transect point. These data are presented in Table 5.

Table 4. Plant Survey Categories

Rank	Cover & Biovolume	Density Category	Description
0	No plants	Trace	Single to a few plants
1	1-25%	Sparse	Multiple plants but not abundant, about a handful
2	26-50%	Moderate	Numerous plants but not dominate, about a plant rake full
3	51-75%	Dense	Very abundant, more than a rake full
4	76-100%		

Table 5. 2023 Macrophyte Survey Data

Point	Cover	Bio-volume	Bs	BG	Cc	Cd	Ec	Eleo	FG	Iso	Macro	Mega	Mh	Mhum	Nf	Nm	No	Nv	Pa	Pc	Poly	Prob	Pspir	Pot	Sg	Spar	Usp	Va
A-1	3	2															D				D							
A-2	4	2	D						M						S		M	S										M
A-3	4	2	D														S	D										S
A-4	4	2	S		S	D			M						M		D											D
A-5	4	2	T								S				S	T	T	S									M	S
A-6	4	2							M		T				M		T	T					S				T	S
A-7	2	1	S									S			M													S
A-8	1	1									M										T							T
A-9	1	1				S					S																	
A-10	0	0																										
A-11	0	0																										
A-12	0	0																										
A-13	1	1			T						T																	T
B-1	4	3	T		S				S						M	S	D	S									M	D
B-2	4	3			T										S		D											M
B-3	4	2									D						M	T									S	D
B-4	4	2										D				M	S										S	D
B-5	4	2										D			M	S	M							T			S	D
B-6	4	2									D					M											M	S
B-7	4	2									D				S	S	M										S	S
B-8	4	2									D				S	M	M	S						T				M
B-9	4	2									D				S	S											M	D
B-10	4	2									D						D											S
C-1	4	3			D						D																	D
C-2	3	1		S	S																		D					
C-3	3	2			M								T										S					
C-4	4	3			D																							
C-5	1	1			T																							
C-6	0	0																										
C-7	1	1			T																							
C-8	4	2			M										M									S				D
D-1	4	4			D							S	M		S		D										S	D
D-2	4	2									D				S		M	M									S	S
D-3	4	2			T						M				S	S		S									M	D
D-4	4	2	T		S				S		D				S	S											T	D
D-5	4	2	M		S						D							S										D
D-6	4	2									D																S	S
D-7	4	2									D																	S
D-8	4	2									D																	S
D-9	4	2			T						D				S	S								T				M

Shaded cell indicates dominant species at observation point.

Table 5 (continued). 2023 Macrophyte Survey Data

Point	Cover	Bio-volume	Bs	BG	Cc	Cd	Ec	Eleo	FG	Iso	Macro	Mega	Mh	Mhum	Nf	Nm	No	Nv	Pa	Pc	Poly	Prob	Pspir	Pot	Sg	Spar	Usp	Va	
D-10	4	2									D																M	S	
D-11	4	2			T						D																		M
D-12	4	3			D																								
D-13	4	4			D																								
E-1	4	2			T				S		D					M													D
E-2	3	3			M								T				T												D
E-3	4	2			S																						T	D	
E-4	3	2			D																								
E-5	4	3			D								T																
E-6	4	3			D							T	T																
E-7	4	3			D								S														T		
E-8	4	3			D																								
F-1	2	2			D																								M
F-2	4	3			D								S																
G-1	4	4			D								S				T										S	S	
G-2	4	4			D												M												
H-1	4	2			S										M														D
H-2	2	2			M																						T	S	
I-1	4	2			S												S										M	D	
I-2	3	2			D								S																
Frequency of Occurrence			8	1	35	2	0	0	6	0	22	5	9	0	18	11	21	10	0	0	2	2	1	4	0	0	28	31	
Frequency Dominant			2	0	15	1	0	0	0	0	16	2	0	0	0	0	6	1	0	0	1	1	0	0	0	0	2	15	

Shaded cell indicates dominant species at observation point.

Key to species

Bs – <i>Brasenia schreberi</i> (watershield)	No – <i>Nymphaea odorata</i> (white-flower waterlily)
BG – <i>Cyanobacteria</i> (Bluegreen algae)	Nv – <i>Nuphar variegata</i> (yellow-flower waterlily)
Cc – <i>Cabomba caroliniana</i> (fanwort)	Pa - <i>Potamogeton amplifolius</i>
Cd - <i>Ceratophyllum demersum</i> (coontail)	Pc - <i>Potamogeton crispus</i>
Ec - <i>Elodea canadensis</i> (waterweed)	Prob – <i>Potamogeton robbinsii</i> (Robbins pondweed)
FG – filamentous algal mats	Pspir - <i>Potamogeton spirillus</i> (spiral pondweed)
Iso - <i>Isoetes</i> sp. (quillwort)	Pot – <i>Potamogeton</i> spp. (pondweeds)
Mega - <i>Megalondonta beckii</i> (water marigold)	Sg - <i>Sagittaria graminea</i> (duck potato)
Macro algae: Ni.f – <i>Nitella flexilis</i> and/or <i>Chara</i> (stonewort)	Spar – <i>Sparganium</i> sp. (<i>bur-reed</i>)
Mh – <i>Myriophyllum heterophyllum</i> (variable-leaf milfoil)	Usp – <i>Utricularia</i> spp. (bladderwort)
Nf - <i>Najas flexilis</i>	Va - <i>Vallisneria americana</i> (tapegrass)
Nm - <i>Najas minor</i> (brittle waternymph)	

Table 6 provides a comparison between the last five surveys. The “IN” column in Table 6 represents the sample locations that were susceptible to the prior year’s drawdown (“in” the drawdown zone). One would expect to see changes in this column with variation of drawdown depth, provided the weather is ideal (exposed shoreline is subjected to freezing temperatures for a prolonged period without the insulating effect of snow cover). The “OUT” column represents data at sample locations where water depths are greater than the drawdown depth (“out” of the drawdown zone). No change related to the drawdown is expected in these cells. Ranks shaded green represent a change of two or more categories lower than the previous year and, in general, represent a desired outcome. Numbers shaded red indicate a two category change higher (an increase in plant cover or biovolume over the previous year). The prior year’s drawdown depth is shown in parentheses next to the year.

Data for 2022 were expected to be more desirable than 2021 given the lack of drawdown depth maintained in the prior year. The survey data indicate cover conditions were slightly higher than 2021 (increased at eight locations and decreased at three locations) but five of the eight locations with increased cover occurred outside the drawdown. Data in 2023 were expected to be lower given the deeper drawdown, but the temperatures were not excessively cold and there was a lot of precipitation. Plant cover did decrease at seven locations, but only two were within the drawdown zone. However, the locations outside the drawdown zone still could have been influence by the drawdown (e.g., ice movement, colder temps etc.). Cover increased at five locations. These locations had more bladderwort (*Utricularia* spp.) and tapegrass (*Vallisneria americana*) than in 2022.

Biovolume decreased at one location but increased at five locations (four within the drawdown zone) from 2022. Three of the four areas which showed increases inside the drawdown zone were attributable to more tapegrass. The remaining area showed an increase in bladderwort. Both species are native but can be nuisance.

The increased bladderwort was also apparent lake wide (Table 7 and Figure 9) with 30 more observation points containing bladderwort. Tapegrass frequency of occurrence was similar to last year, but perhaps it became denser in 2023. Fanwort frequency increased by 18% in 2023. Robbins pondweed (*Potamogeton robbinsii*) decreased for a second year in row, but only by 3%. The decline in this species is unexplained. This plant is a beneficial native species, but it is most frequently observed along Transects C and E. These areas are outside the drawdown zone are currently dominated by fanwort. Brittle naiad was present again in the southern portion of the lake. It was first observed in the southern end in 2022. Tapegrass increased in abundance in 2022 and continued to expand in 2023. Select plant species frequency data are shown in Figure 10.

Table 6. Bare Hill Pond Cover and Biovolume Relative Change

	Point	Cover								Biovolume								
		2020 (6.0')		2021 (3.0')		2022 (6.5')		2023 (7.5')		2020 (6.0')		2021 (3.0')		2022 (6.5')		2023 (7.5')		
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	
Transect A	1	4			2		4	3		4		1		3	2			
	2	2			3	2		4		1		2	2		2			
	3	4			4	4		4		1		2	3		2			
	4	4			2	4		4		1		2	3		2			
	5	4			3	4		4		1		2	2		2			
	6	4			3	4		4		1		2	2		2			
	7	1			4	2		2		1		1	2		1			
	8	2			3	4		1		1		1	1		1			
	9		1		3	3		1			1		1	1		1		
	10		1		0			4		0		1		1		0		
	11		2		0			2		0		1		0		1		0
	12		0		0			1		0		0		0		1		0
	13	2			1	1		1		1		1		1		1		
Transect B	1	4			4	4		4		3		4	3		3			
	2	4			4	4		4		2		2	2		3			
	3	5			4	4		4		2		2	2		2			
	4	5			4	4		4		2		2	2		2			
	5	5			4	4		4		2		2	2		2			
	6	5			4	4		4		2		2	2		2			
	7	5			4	4		4		2		2	4		2			
	8	5			4	4		4		2		2	2		2			
	9	5			4	4		4		2		2	2		2			
	10	5			4	4		4		2		2	2		2			
Transect C	1	1			4	4		4		1		1	1		3			
	2		4		4		4	3			1		2		2		1	
	3		4		4		4	3			2		2		2		2	
	4		3		3		3	4			2		3		2		3	
	5		1		0		0	1			1		0		0		1	
	6		4		0		1	0			2		0		1		0	
	7		4		0		4	1			2		0		2		1	
	8		4		3	4		4			3		1	2			2	
Transect D	1	4			5	4		4		2		4	1		4			
	2	4			4	4		4		2		4	1		2			
	3	4			4	4		4		2		4	1		2			
	4	4			4	2		4		1		3	1		2			
	5	4			4	4		4		1		3	2		2			
	6	4			4	4		4		2		2	1		2			
	7	4			4	4		4		2		3	1		2			
	8	4			5	4		4		2		1	1		2			
	9	4			5	4		4		1		1	1		2			
	10	4			4	4		4		1		1	1		2			
	11	4			4	4		4		1		1	1		2			
	12		4		2	4		4			2		1	2		3		
	13	0			2			4	4		0		2		3		4	
Transect E	1	5			2	4		4		2		1	3		2			
	2	5			4	4		3		2		1	2		3			
	3		5		4	4		4			2		2	3		2		
	4		4		2	3		3			2		2	1		2		
	5		4		3		4	4			2		2		3		3	
	6		4		4		4	4			2		2		4		3	
	7		4		4		4	4			2		2		3		3	
	8		3		2		4	4			2		1		3		3	
Supplemental	F-1	1			0	0		2		1		0	0		2			
	F-2		5		4	3		4			2		2			3		
	G-1	4			3	3		4		2		2	3		4			
	G-2		4		4		4	4			2		3		3		4	
	H-1	1			1	0		4			1		1	0		2		
	H-2		4		2	4			2			2		2			2	
	I-1	1			2	2		4			1		1	1		2		
I-2		4		1		0		3			1		1		0		2	

Increase by 2 or more ranks from prior year Decrease by 2 or more ranks from prior year

Table 7. Select Species Frequency of Occurrence (%)

	Water Shield	Fanwort	Milfoil	Macro Algae	Filament Algae	Water Lily	Naiad	Pond Weed (Robins)	Bladder wort	Tapegrass
1998	13	4	79	0	25	29	0	79	40	0
2001	5	11	74	3	56	14	0	32	44	0
2004	8	0	44	2	42	15	0	54	44	0
2007	8	35	17	44	15	12	38	31	25	0
2010	52	70	30	85	70	35	74	81	22	0
2013	23	44	19	81	40	29	73	12	19	33
2014	27	73	27	31	10	29	4	15	29	15
2015	17	31	29	54	6	27	6	21	12	25
2016	25	43	42	45	23	27	30	28	8	38
2017	23	43	45	48	18	17	12	28	20	32
2018	20	42	30	43	10	28	25	32	15	30
2019	20	73	32	30	42	22	32	30	12	48
2020	18	37	7	40	12	38	8	23	0	40
2021	13	47	15	25	0	33	40	20	22	40
2022	7	40	15	38	42	50	50	7	17	53
2023	13	58	15	37	10	52	48	3	47	52
Increase/Decrease from prior year										
	7	18	0	-2	-32	2	-2	-3	30	-2

Naiad includes both native and non-native species occurrence.

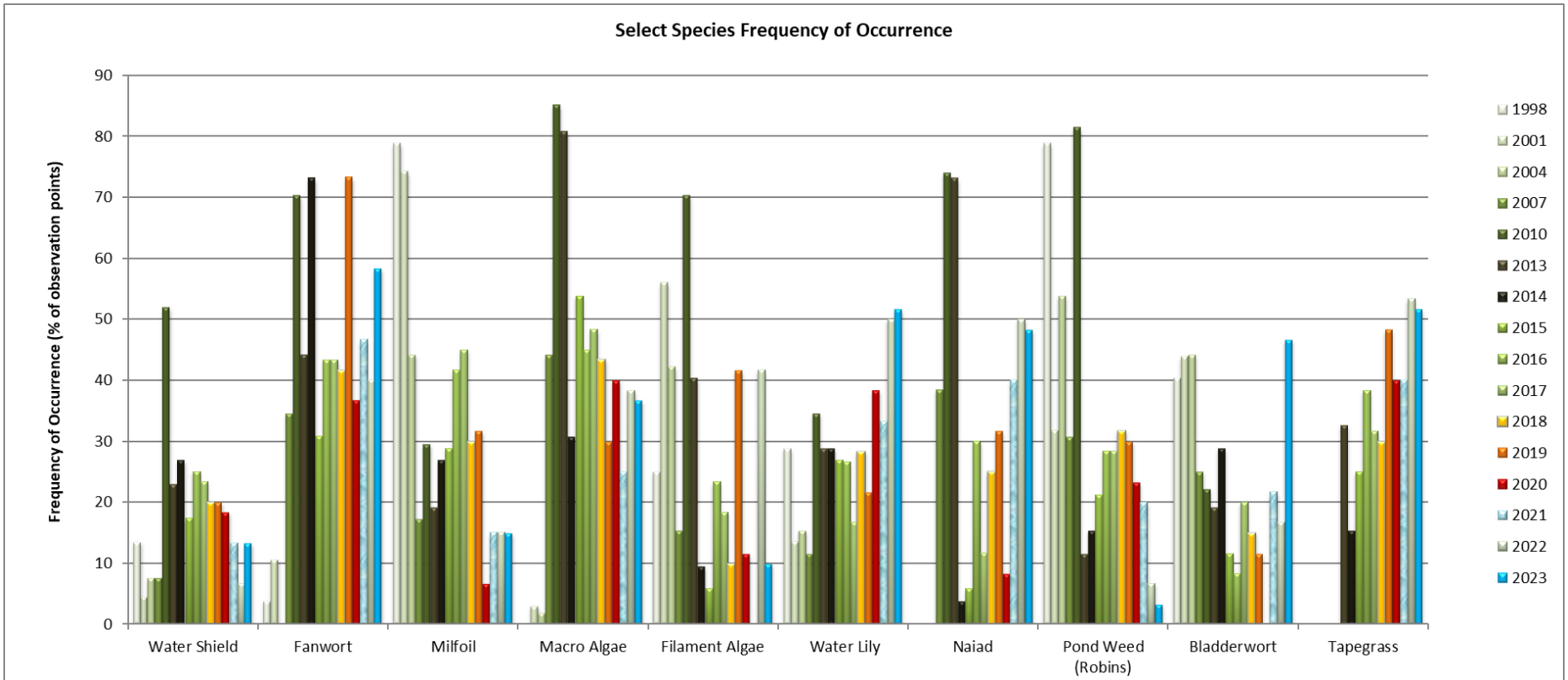


Figure 10. Bare Hill Pond Select Plant Species Frequency of Occurrence

Conclusion

Surface water total phosphorus concentrations were elevated in surface and in bottom waters of the in June and August. July was a wet month with low concentrations so some phosphorus could have been flushed out or diluted with higher water levels. With the sustained and expanding zone of low to no oxygen in portions of the lake deeper than 10 feet, internal loading remains a concern. The consecutive years of cyanobacteria blooms (2020 & 2021) are a symptom of warmer, low oxygenated, nutrient-rich waters. The Department of Health monitoring of photosynthetic pigments is helpful to track algal biomass and provide early warning of potential bloom. Secchi disk transparency was high early this year but declined over the summer, but still represents a substantial improvement over 2021.

The aquatic plant coverage was slightly increased over 2022 in the drawdown zone but decreased in deeper waters. The plant coverage reduction in deeper water could have been the result of the unintended deeper drawdown. Biovolume was slightly increased over 2022 with much of the plant volume attributable to two native species (bladderwort and tapegrass). Unfortunately, these species can become problematic for recreation even though they are native to New England. Many lakes have seen an increase in bladderwort this year; the cause is unknown. The density of fanwort has increased outside the drawdown zone but continues to be minimal in the drawdown zone. Non-native brittle naiad was comparable to last year and has not impeded recreation or reduce plant diversity in the lake. The lake has sustained a desirable coverage of low growing macroalgae and other native seed producing plants, such as pondweeds, in the drawdown zone following successful drawdown years.

We expanded the monitoring program in 2022 to better understand the cause of recent algal blooms. We suspect the lake may have reached a tipping point where the warming summers and increased availability of phosphorus from sediments will continue to result in more frequent and severe blooms. The sediment results from 2021 showed that phosphorus in the lake could increase by 0.02 mg/L if 20% of the sediment iron-bound phosphorus is released under anoxic conditions. Thankfully, the lake has been bloom-free thus far in 2023 and we may have avoided a potential bloom that was exhibited by the late July fluorometer readings. Although water clarity was low in August.

The pond's plant community is dense and diverse enough to support fish and wildlife, there are shifts in species composition between years, but the drawdown has proven to improve conditions; reduced dense monocultures of fanwort and milfoil in the drawdown zone and is encouraging growth of low growing beneficial plants that are less of a nuisance for recreation. The drawdown is likely improving flushing and ridding the lake of accumulated phosphorus from internal recycling over the summer. The weather may be the most influential factor as to whether the lake experiences a bloom or not. There is ample phosphorus available at the sediment water interface and whether cyanobacteria uptake that phosphorus and rise to the surface could be associated with weather patterns (light, temperature, precipitation, etc.) but this is still not well understood by phycologists. Conditions may become worse if algae and associated nutrients are not flushed out of the system.

Recommendations

We have expanded the water quality monitoring program in 2022 to include early and late season data and have added three monitoring stations to evaluate conditions in areas deep enough to go anoxic. These data will reduce data gaps and will assist in evaluating options for oxygen mitigation, if warranted. This program should be continued in 2024, especially since the first year was an outlier weather year with a severe drought and we experienced a wet start to this summer.

Given the success of the drawdown over the years in minimizing non-native fanwort and milfoil density within the drawdown zone and improved flushing, the Committee wishes to implement a 6.5-foot drawdown this coming winter. This will reduce non-native species abundance and provide an added benefit of reduced phosphorus retention. The aquatic macrophyte survey, and other fauna surveys performed by the Committee will continue an annual basis to assess year to year changes.



MACC Annual Environmental Conference 2024 Workshops At-A-Glance

Series A 9:45 AM - 11:00 AM	Series B 11:15 AM – 12:30 PM	Series C 1:45 PM - 2:45 PM	Series D 3:00 PM - 4:00 PM
A1. Identifying Woody Wetland Plants in Winter Double Session	B1. Identifying Woody Wetland Plants in Winter Double Session	C1. Soils of Massachusetts and Wetlands, Part A Double Session	D1. Soils of Massachusetts and Wetlands, Part B Double Session
A2. Potpourri Q&A: All Your Burning Legal and Practical Commission Questions	B2. Vernal Pools: How Cool are They? And What Do We Do When We See One?	C2. Permitting Energy Projects and Protecting Wetlands	D2. Using Drones with GPS and GIS for Remote Sensing
A3. Protecting Wildlife Habitat	B3. Assessing, Replacing and Permitting Road-Stream Crossings	C3. Flooding and Environmental Justice Communities: A Vulnerability Assessment	D3. MassDEP’s New Handbook for Delineation Bordering Vegetated Wetlands: What’s New?
A4. Developed Coastal Dune and Barrier Beach Resource Delineations, Functions, and Performance Standards	B4. BioMap in Action: Case Studies of Municipal and Regional Applications	C4. Municipal Wetlands Bylaws, Ordinances, and Regulations: A Review of Your Community’s Legislative Materials	D4. MA Environmental Policy Act (MEPA) 101 and Regulatory Updates
A5. Successful Grant Writing for Natural Resource Protection & Management Hybrid	B5. Redevelopment in the Riverfront Area: Regulation Review Hybrid	C5. Considerations in Permitting Artificial Turf Fields Hybrid	D5. Get Back Here, You Obnoxious Plant: A Guide to Adaptive Invasive Species Management Hybrid
A6. How Conservation Commissions Can Effectively Review and Permit Green Infrastructure	B6. Green Stormwater Infrastructure Maintenance Toolbox	C6. Demystifying Dam Removal: Resources to Help Navigate the Long Process	D6. Oil and Hazardous Materials Releases and Wetlands: Where Wetland Regulations and the MA Contingency Plan Intersect
A7. Increasing Momentum of Ecological Restoration Programs for Climate Adaptation: A Panel Discussion	B7. “Forever-Proof” Conservation Land: Conservation Restrictions and Other Tools to Permanently Preserve Land	C7. Indigenous Partnerships in Land Management: Natick’s Atlantic White Cedar	D7. Educating the Next Generation: Bristol County Agricultural School
A8. Bylaws Why Laws? Effective Wetlands Enforcement in Your Community	B8. Hiring “53G” Consultants using Chapter 30B- the Uniform Procurement Act	C8. Land Conservation and Restoration Opportunities on a Former Golf Course	D8. Wetlands Protection Act (WPA) 101 Trivia with the MassDEP Circuit Riders
FUNDAMENTALS FOR CONSERVATION COMMISSIONERS’ UNITS			
9:45 AM - 12:15 PM		1:30 PM - 4:00 PM	
Unit 201: Getting Home Before Midnight: How to Run an Effective Meeting		Unit 103: Plan Review & Site Visit Procedures	



Annual Environmental Conference, March 2, 2024

Workshop Descriptions and Fundamentals for Conservation Commissioners Units Content

Workshop Series A 9:45 – 11:00 AM

A1 Identifying Woody Wetland Plants in Winter (A1 & B1 – Double Session)

While soils have become a more significant indicator of identifying and delineating freshwater wetlands, as the “above ground” indicators, plants still play a key role in this process. This workshop will focus on the most frequently encountered trees, shrubs, and vines of swamps, bogs, marshes, and other freshwater wetlands in Massachusetts. This two-block session will include PowerPoint presentations and a long-awaited “hands-on” identification that will cover characteristics used in field identification. The classroom set-up will include live winter specimens, which, along with additional photos and field guides, will help attendees recognize common freshwater wetland plants in the field using the most prominent features of each plant. **Workshop A1 is the first part** of the workshop and will be dedicated to a review of some basic botanical terminology as well as an overview of the plant specimens collected. **Workshop B1 is the second part** of the workshop that will explore some of the more common woody wetland plants found in forested swamps and shrub swamps in Massachusetts “hands on!” This workshop is intended for beginners and/or a refresher on basic wetland plant identification. **Participants must sign up for both sessions.**

Speakers: Amy Ball, PWS, CWS, Senior Associate, Horsley Witten Group, Inc.; MACC President
Karro Frost, Plant Restoration Biologist, Natural Heritage and Endangered Species Program, MA
Division of Fisheries and Wildlife

A2 Potpourri Q & A: All Your Burning Legal and Practical Commission Questions

Conservation agents and commission members have so many questions on so many subjects and so few sources of straight answers and useful tips. This workshop is a space for you to share what is on your mind. It will be fast paced, focused on nuts and bolts, and painfully practical. Expect responses to be brief and to the point. Bring your burning questions relating to wetlands, laws, regulations, procedures, meetings, powers, enforcement, financial or personnel issues, politics, practices, needs, and problems that plague conservation commissions. We will give you off-the-record legal information and reliable, practical directions of the sort you get on the MACC Help Line without having to write it down or wait for a reply! This workshop is perfect for beginner as well as advanced participants.

Speakers: Gregor I. McGregor, Esq., Founding Partner, McGregor Legere & Stevens, PC; MACC Director
Michele Grzenda, Conservation Director, Town of Lincoln; Director, Massachusetts Society of
Municipal Conservation Professionals (MSMCP)

A3 Protecting Wildlife Habitat

Wildlife habitat is one of the eight “interests” protected by the MA Wetlands Protection Act. Applicants are required to submit wildlife habitat evaluations for certain projects and conservation commissions are supposed to ensure that projects affecting resource areas do not reduce the capacity of those areas to serve as wildlife habitat. Conservation commissions have other ways of protecting habitat as well, including land protection and land stewardship, and by seeking opportunities to enhance landscape connectivity. This workshop will cover the basics of protecting wildlife habitat during project review and permitting, and how to work with others in your community to protect habitat more broadly.

Speaker: Scott Jackson, Extension Professor, Department of Environmental Conservation, UMass Amherst,
Whately Conservation Chair, Town of Whately

A4 Developed Coastal Dune and Barrier Beach Resource Delineations, Functions, and Performance Standards

MA Office of Coastal Zone Management and MA Department of Environmental Protection staff will provide guidance based on the *Coastal Manual* for delineation of resource areas and assessing the beneficial functions of developed coastal dunes on barrier beaches. Site examples will be used to illustrate the challenges that developed sites pose in delineation of resource areas on developed barrier beaches. The presentation will discuss what information should be requested as part of a resource delineation, what to look for in the field, and sources of information that should be consulted when making decisions. Guidance regarding the potential impacts of typical project activities in coastal dunes will also be discussed.

Speakers: Rebecca Haney, Certified Floodplain Manager (CFM), Coastal Geologist, MA Office of Coastal Zone Management
Jill Provencal, Wetlands Section Chief, Northeast Region, MassDEP Wetlands Program

A5 Successful Grant Writing for Natural Resource Protection & Management

Do you want to apply for a land protection grant and do not know where to start? The Town of Middleborough has successfully applied for and been awarded several local, state, and federally funded grants to complete land protection projects. Learn about the components of a successful grant application from the municipal perspective, including the time that it takes to complete the process from beginning to end. Learn about the successes and challenges Middleborough has experienced administering their grants. This workshop is designed to meet the needs of novice grant writers and will benefit those wishing to review and compare their current procedures. *(hybrid workshop)*

Speaker: Patricia J. Cassidy, Conservation Agent, Town of Middleborough

A6 How Conservation Commissions Can Effectively Review and Permit Green Infrastructure

This workshop will focus on developing and implementing effective practices for Notices of Intent (NOI)/permit review and site inspections specifically related to incorporating Green Infrastructure and Low Impact Development. It will focus on promoting Green Infrastructure and Low Impact Development as alternatives to traditional stormwater Best Management Practices (BMPs) and will cover what to consider during public hearings, conditions to incorporate into Orders of Conditions for various Green Infrastructure BMPs, and the importance of monitoring and maintaining Green Infrastructure BMPs. Also included will be practical recommendations for what to look out for and request during construction inspections, as well as how, and when, to monitor post-construction. Be sure to bring your questions to this important workshop.

Speaker: Angela Panaccione, Senior Environmental Planner, Pioneer Valley Planning Commission

A7 Increasing Momentum of Ecological Restoration Programs for Climate Adaptation: A Panel Discussion on Identifying Opportunities to Increase Capacity across the Commonwealth

There is increasing recognition for the role that ecological restoration plays in climate change adaptation and mitigation strategies. Recent state and federal funding for restoration programs has grown in response, which has stretched the capacity of municipalities, consultants, and state officials. A panel of stakeholders will share their experience completing ecological restoration projects that have contributed to more than seventy dam removals, reconnected three hundred river miles, and restored 3,000 acres of coastal wetlands across the Commonwealth. The discussion will highlight best practices and lessons learned, with the goal of identifying opportunities for providing new tools and best practices to increase the pace and scale of ecological and aquatic habitat restoration projects.

Speakers: Kristen Ferry, Habitat Restoration Branch Manager, MA Division of Ecological Restoration
Ian Balcom, Technical Services Branch Manager, MA Division of Ecological Restoration
Carrie Banks, Capacity Building Branch Manager, MA Division of Ecological Restoration

A8 Bylaws Why Laws? Effective Wetlands Enforcement in Your Community

Are people behaving badly? Is the threat of being on Santa's naughty list not helping? What, you did not think you would have to be the 'heavy' in this volunteer position? Let us take the weeping and gnashing of teeth out of enforcement as you learn the basics (and a little more) about Enforcement Orders, jurisdiction, boardroom procedure, your relationship with MassDEP, non-criminal disposition, civil and criminal complaints, obtaining site access through warrants, tickets and fines, going to court, and more.

Speakers: Glenn Wood, Esq., Partner and Chair, Environmental and Land Use, Rubin and Rudman, LLP
Brandon Faneuf, MSc., PWS, CWB, President, Ecosystem Solutions, Inc.; MACC Director

Workshop Series B 11:15 AM – 12:30 PM

B1 Identifying Woody Wetland Plants in Winter (A1 & B1 – Double Session)

While soils have become a more significant indicator of identifying and delineating freshwater wetlands, as the "above ground" indicators, plants still play a key role in this process. This workshop will focus on the most frequently encountered trees, shrubs, and vines of swamps, bogs, marshes, and other freshwater wetlands in Massachusetts. This two-block session will include PowerPoint presentations and a long-awaited "hands-on" identification that will cover characteristics used in field identification. The classroom set-up will include live winter specimens, which along with additional photos and field guides will help attendees recognize common freshwater wetland plants in the field using the most prominent features of each plant. Workshop B1 is the second part of the workshop. **During this part of the double-session workshop**, participants will explore some of the more common woody wetland plants found in forested swamps and shrub swamps in Massachusetts with a "hands-on" approach! This workshop is intended for beginners and/or a refresher on basic wetland plant identification. **Participants must sign up for both sessions.**

Speakers: Amy Ball, PWS, CWS, Senior Associate, Horsley Witten Group, Inc.; MACC President
Karro Frost, Plant Restoration Biologist, Natural Heritage and Endangered Species, MA Division of Fisheries and Wildlife

B2 Vernal Pools: How Cool are They? And What Do We Do When We See One?

Vernal pools are a vital component of healthy ecosystems across the state, and they receive a host of legal protection under federal, state, and local wetland regulations. Their ecological values are at the root of why we protect them; their variety, temporary nature, and fluctuations are at the root of why we are often confused about how we protect them. Together we will explore why they are so important and the real-world process of how to review a project with a vernal pool along with the jurisdictional issues. This workshop is important for all conservation commissioners and consultants – make sure you do not miss this important workshop given by Vernal Pool experts.

Speakers: Matt Burne, Senior Ecologist, BSC Group, Inc.; Conservation Commission, City of Malden;
President, Vernal Pool Association; MACC Director
Jennifer Carlino, Land Use and Environmental Planner, Town of Easton; Director, Massachusetts Society of Municipal Conservation Professionals; Board member, Vernal Pool Association

B3 Assessing, Replacing and Permitting Road-Stream Crossings

Conservation commissions have a dual role with regard to the replacement of culverts (and bridges) in their communities. They can play a significant role in assessing and prioritizing culverts for replacement, and advocates for better crossing designs that allow fish and wildlife passage. Commissions are also responsible for permitting culvert replacements, including review of crossing designs and construction plans, and interpretation of the regulatory standard to meet the River and Stream Crossing Standards "to the maximum extent practicable." This workshop will cover the assessment and prioritization of culverts for replacement, regulatory requirements including how commissions can apply the "maximum extent practicable" standard, what to look for when reviewing culvert replacements designs, and lessons learned from recent culvert replacement projects.

Speakers: Lisa Rhodes, Wetlands Program Chief, MassDEP Wetlands Program
Scott Jackson, Extension Professor, Department of Environmental Conservation, UMass Amherst
Holden Sparacino, Stream Continuity Program Manager, MA Division of Ecological Restoration

B4 BioMap in Action: Case Studies of Municipal and Regional Applications

Municipal-level decisions and actions are critical to the long-term viability of our state's diverse habitats, resilient ecosystems, and connected landscapes. The new BioMap, released in the Fall of 2022, incorporates enhancements and updates to statewide habitat data including the addition of local information and climate resilience data. In addition, new BioMap town reports were recently released to support municipalities with relevant, updated information for planning and grant proposals. This workshop will build on the outreach, support, and technical assistance to municipalities over the past year. We will provide a quick overview of BioMap, then provide multiple case studies, from the experience of the BioMap Outreach Specialist and from Conservation practitioners to give tangible lessons for Conservation Commissions, Open Space Committees, and Regional Planning Agencies. With concrete examples from across the state, this presentation will provide towns with frameworks to incorporate essential biodiversity conservation and climate resilience into their work.

Speakers: Sarah Wasserman, Land use and Sustainability Coordinator, Town of Carlisle
Andy Finton, Senior Conservation Ecologist, The Nature Conservancy
Abby Hardy-Moss, Director of Conservation technology and Planning Division, Essex County
Greenbelt Association

B5 Redevelopment in the Riverfront Area: Regulation Review

This workshop will provide an overview of 310 CMR 10.58(5), Redevelopment Within Previously Developed Riverfront Areas; Restoration and Mitigation, including when to use the redevelopment regulations and how to apply them. The workshop will also explore three to four case studies as a practical implementation of the regulations. Commissioners and consultants at the entry and mid-level will benefit from this important presentation. There will be time for questions and answers, so bring your thorny questions about Riverfront Area Redevelopment. (*hybrid workshop*)

Speaker: Whitney McClees, Environmental Analyst, Southeast Region, MassDEP Wetlands Program

B6 Green Stormwater Infrastructure Maintenance Toolbox

Increasingly, Green Stormwater Infrastructure (GSI) projects are completed and installed throughout Massachusetts, time and energy will need to be dedicated to maintaining the structures. Typically, an Operation and Maintenance Plan is developed for each GSI project that is proposed, but the Plan is not always followed. Whether this is due to the lack of staff needed to perform these duties or uncertainties regarding how to use the Plan, it is essential that a form of GSI maintenance be performed on an annual basis (minimum) to ensure proper functioning of the systems. In the workshop, we will address the uncertainties faced when dealing with maintenance needs, as well as provide a maintenance toolbox to use to identify how to maintain your local GSI practices.

Speakers: Geoffrey Glover, PE, Senior Engineer, Horsley Witten Group
Gemma Kite, PE, Senior Environmental Engineer, Horsley Witten Group

B7 “Forever-Proof” Conservation Land: Conservation Restrictions and Other Tools to Permanently Preserve Land

Conservation land seems to be protected forever – until it is no longer there. This workshop will describe options for municipalities to permanently preserve land. Learn how to implement and maintain conservation restrictions, from drafting clearly written restrictions, to understanding the steps involved in implementing the restrictions and effective ways to record restrictions, as well as obtaining final approval of the restrictions. Bring your land conservation questions to this important workshop.

Speakers: Vanessa Johnson-Hall, Director, Land Conservation Division, Essex County Greenbelt Association
Jessica Grigg, President, BTA/BOLT, Inc.

B8 Hiring “53G” Consultants using Chapter 30B – the Uniform Procurement Act

Conservation commissions must hire different consultants to be effective. Consultants may include attorneys, habitat specialists, engineers, hydrologists, and other specialists. Chapter 30B and Chapter 44, § 53G provide the “rules” for hiring these consultants but interpreting the rules can sometimes be difficult. This presentation will review which consulting services are exempt from the procurement rules, best practices for hiring consultants, and using the procurement rules effectively to get commissions what they need. The Director of the Regulatory and Compliance Division in the Inspector General’s Office will answer your questions. This is a great learning opportunity for either entry-level or experienced commissioners and consultants.

Speaker: Neil Cohen, Director, Regulatory & Compliance Office of the Inspector General, Commonwealth of Massachusetts

Workshop Series C 1:45 PM – 2:45 PM

C1 Soils of Massachusetts and Wetlands: Part A (C1 & D1 – Double Session)

How did the soils of Massachusetts get to be the way they are, and how does that affect where and how wetlands form? The speaker will provide an overview of soil formation in the glaciated northeast and the resultant widespread characteristics and variabilities with emphasis on soil parent material; the stuff from which the soil developed. The objective is to provide a context for wetland formation under different soil-landscape scenarios and background information for “Soils of Massachusetts and Wetlands, Part B.” This workshop will be useful to all commissioners and consultants alike; be sure to sign up early for this popular workshop. **Participants must sign up for both sessions C1 and D1.**

Speaker: Al Averill, Certified Professional Soil Scientist

C2 Permitting Energy Projects and Protecting Wetlands

As the demand for energy continues to rise, maintaining a safe and dependable electric and gas transmission system has never been more critical. To ensure reliability and support the Commonwealth’s clean energy goals, energy companies must maintain existing infrastructure to prepare for increased electrical loading, support proliferation of renewable generation, and improve resiliency in the face of more frequent and intense storm events. Presenters will discuss the steps necessary to plan, permit, and maintain electric and gas transmission systems while keeping wetland and wildlife protection a priority. An overview of compliance with Wetlands Protection Act Regulations will be provided. Current project examples and case studies will be discussed to demonstrate how energy projects can be successfully completed while protecting or improving the functions and values of wetland resource areas.

Speakers: Matthew Waldrip, CESSWI, PWS, Supervisor – Licensing & Permitting, Eversource
Rebecca Weissman, PWS, CWS, Energy Director – Northeast, SWCA Environmental; MACC Vice President of Education

C3 Flooding and Environmental Justice Communities: A Vulnerability Assessment

This presentation will share a new ongoing state project to understand the intersection between vulnerable populations and flooding in Massachusetts communities. The project includes development of data and maps that will help local government officials and the public develop a better understanding of local flooding, causes, and potential mitigation. Data gathering will include extensive state and local community conversations and surveys. The maps will show environmental justice community data along with determination of hotspots where flood vulnerability exists now and where it may be projected to increase in the future. Eventually, the project will select a small handful of municipalities for pilot projects to ground truth mapped data, identify causes of flooding in specific hotspots, and assess and prepare for mitigation activities in partnership with municipal and environmental justice community groups. This project began in late 2023 and it will take several years to complete.

Speaker: Nadia Madden, CFM, Floodplain Management Specialist, Flood Hazard Management Program, Mass Department of Conservation and Recreation

C4 Municipal Wetlands Bylaws, Ordinances, and Regulations: A Review of Your Community's Legislative Materials

This workshop aims to dive deep into the language of your local bylaw or ordinance, and if appropriate, it is implementing regulations. This session builds upon the MACC Fall Conference workshop, "Municipal Wetlands Bylaws, Ordinances, and Regulations: How to Strengthen & Affirm Local Standards," to advance the discussion into the technical space of legislative writing. Participants in the workshop will work in groups by region, and they have an opportunity to connect with Commission peers about shared local challenges and regulatory priorities. We will review the existing code in each community and using an outline of model bylaws and an index of available language, suggest improvements to definitions, statements of jurisdiction, performance standards, waivers, and more. This is a wonderful opportunity to talk through local environmental policy initiatives for administrators and commissioners. Be sure to bring examples and questions for this experienced presenter.

Intermediate Level.

Speaker: Adrienne Lennon, Senior Ecologist, BSC Group; MACC Awards Committee member

C5 Considerations in Permitting Artificial Turf Fields

Have you been challenged to consider how to permit Artificial Turf Fields? The science and analyses provided in this workshop are intended to assist conservation commissions in their efforts to evaluate artificial turf field projects in wetland resource areas and buffer zones. The workshop will cover the current science, evidence, and whether it cumulatively points towards adverse impacts of artificial turf fields to wetland resource area values and functions. Additionally, climate resilience impacts will be discussed. Following the Town of Arlington's Artificial Turf Forum, held in May 2023, municipalities that are grappling with the pros and cons of siting Artificial Turf Fields in and around wetland resource areas have been reaching out to the Town for information and guidance. In addition, this workshop will discuss the regulatory framework, recent MassDEP decisions, and recommendations from the Town of Arlington's Artificial Turf Study Committee. *(hybrid workshop)*

Speakers: Susan D. Chapnick, MS., President and Principal Scientist of New Environmental Horizons, Inc.; Vice Chair, Arlington Conservation Commission
David Morgan, Environmental Planner & Conservation Agent, Town of Arlington
Nathaniel Stevens, Esq., Partner, McGregor Legere & Stevens PC; Commissioner, Arlington Conservation Commission; MACC Director

C6 Demystifying Dam Removal: Resources to Help Navigate the Long Process

Many dams in Massachusetts now lack purpose, need repairs, and have become environmental and safety hazards in the face of extreme precipitation. We need to decide the future of dams before their failure decides for us. It is a complicated topic, whether permitting, funding, or even just deciding to remove a dam – but there are practitioners working statewide to help communities navigate this and we invite you to join our community of practice. This workshop will explore added resources, webinars, trainings, and peer learning opportunities available from a collaboration of organizations to help support you prioritize, start, and *finish* dam removal projects.

Speakers: Susie Bresney, Ecological Restoration Specialist, Mass Division of Environmental Restoration
Stefanie Covino, Program Manager, Blackstone Watershed Collaborative
Monica Driggers, Senior Program Director, Mass Rivers Alliance
Robert Kearns, Watershed Restoration Specialist, Charles River Watershed Association

C7 Indigenous Partnerships in Land Management: Natick's Atlantic White Cedar

After developing a partnership with the Nipmuc people to reactivate the harvesting of Atlantic White Cedar from conservation land, the Town of Natick has continued efforts to partner with indigenous communities on land management. A Stewardship Plan for the Sunkaway Conservation Area is underdevelopment, including collaboration with local conservation stewards and the Nipmuc people to develop long-term stewardship goals to ensure that cultural resources are healthy and accessible for generations to come. This project, along with several others in Town, are serving as a foundation for prioritizing the indigenous community's relationship with this land in the present day.

Speakers: Claire Rundelli, Environmental Planner and Conservation Agent, Town of Natick
Kristen Wyman, Hassanamisco Nipmuc Tribal Citizen, Land and Agricultural Worker

C8 Land Conservation and Restoration Opportunities on a Former Golf Course

In 2020, the City of Northampton purchased the 105-acre Pine Grove Golf Course with the goals to protect open space, enhance the recreational trail network, and restore stream and wetlands ecosystems. With funding from the Municipal Vulnerability Preparedness (MVP) program, the City initiated restoration activities by removing tile drains and catch basins that shunted water to the stream; scarifying the fairways to allow vegetation regrowth on former turfgrass; and planting seedlings in upland fairways. Now, the City in partnership with Mass Audubon and MA Division of Ecological Restoration, is planning additional restoration interventions to reconnect the stream and floodplain, restore longitudinal connectivity, replant riparian buffers, increase flood storage, and facilitate wetland formation. As one of the first golf courses in Massachusetts that is being actively restored for ecological benefit, this presentation will also discuss learning opportunities that can be applied to restoration of other, similar opportunities.

Speakers: Kate Bentsen, Ecological Restoration Specialist, MA Division of Ecological Restoration
Sarah LaValley, Assistant Director, Office of Planning and Sustainability, Northampton; MACC Director

Workshop Series D 3:00 PM – 4:00 PM

D1 Soils of Massachusetts and Wetlands: Part B (C1 & D1 – Double Session)

How does soil morphology serve to identify wetlands? The speaker will offer a discussion of soil-hydrological relationships and influence on soil profile formation and morphology with emphasis on the effect of wet conditions. The objective is for folks to have an increased understanding of the morphological variabilities under different wetness and soils conditions. Standards applied to field documentation and sources of information will be covered.” This workshop will be useful to all commissioners and consultants alike but be sure to sign up early for this popular workshop. **Participants must sign up for both sessions C1 and D1.**

Speaker: Al Averill, Certified Professional Soil Scientist

D2 Using Drones with GPS and GIS for Remote Sensing

Drones are becoming an increasingly popular tool for a wide range of uses in the environmental field. They are (reasonably) cheap and readily available and can be used to provide incredibly useful, high-resolution aerial photographic data that is useful in ecological inventory, survey, project planning, both construction and compliance monitoring, among other things. This workshop will cover the basics of what drones are, diverse ways they can be used to fill a variety of conservation purposes, the laws that apply to their use, including operator licensing requirements and Federal Aviation Administration (FAA) coordination, and Geographic Information System (GIS) products that drones can provide for mapping.

Speaker: Jim MacDougall, PWS, Principal, Biodiversity Consulting

D3 MassDEP’s New Handbook for Delineating Bordering Vegetated Wetlands: What’s New?

In the spring of 2023, MassDEP and UMass-Amherst released a revised version of the *Massachusetts Handbook for Delineation of Bordering Vegetated Wetlands*. This presentation provides an overview of this latest version of the delineation handbook and efforts to align delineations conducted under the Massachusetts Wetlands Protection Act with wetland science and the delineation techniques used to determine wetland boundaries at the federal level. Learn about significant changes and enhancements since the previous (1995) version of the handbook.

Speakers: Judith Schmitz, Wetlands Program Section Chief, Central Region, MassDEP Wetlands Program
Scott Jackson, Extension Professor, Department of Environmental Conservation, UMass Amherst;
Conservation Chair, Town of Whately

D4 Massachusetts Environmental Policy Act (MEPA) 101 and Regulatory Updates

The Director and Deputy Director of the Massachusetts Environmental Policy Act (MEPA) Office will present the basic rules of MEPA review and discuss how the MEPA process interacts and can help inform Conservation Commission review. The presentation will describe recent regulatory and policy updates regarding environmental justice and climate resiliency.

Speakers: Tori Kim, Director, Mass Environmental Policy Act Office
Jennifer Hughes, Deputy Director, Mass Environmental Policy Act Office; Conservation
Commissioner, Town of Ipswich; MACC Director

D5 Get Back Here, You Obnoxious Plant: A Guide to Adaptive Invasive Species Management

Are you frustrated by invasive species squeezing your habitats? Overwhelmed by treatment options and treatment opinions that do not have a clear strategy for long-term habitat health? Has lack of funding or participation blocked your goals? We explore how to shift from fighting what feels like unsurmountable odds to restoring and building habitat function through implementing Invasive Species Management Programs. *(hybrid workshop)*

Speakers: Rob Tyler, PWS, Wetland Scientist, BSC Group
Casey-Lee Bastien, Landscape Architect, BSC Group

D6 Oil and Hazardous Materials Releases and Wetlands: Where Wetland Regulations and the MA Contingency Plan Intersect

Occasionally, Conservation Commissions are presented with a situation involving the release of Oil or Hazardous Materials (“OHM”) in wetlands. This session attempts to prepare Commissioners for such an occurrence, so that appropriate OHM cleanup can occur in an expeditious manner, while protecting wetland interests and complying with wetland regulations. Topics covered will include definitions of oil and hazardous materials and other terms; the regulatory process; the Massachusetts Contingency Plan’s OHM regulations, the role of Licensed Site Professionals (LSPs) and MassDEP; the wetlands permitting process, including Emergency Certifications and “Limited Projects.” The presenter will also discuss the risk assessment process for human and ecological receptors. “How clean is clean enough?” Case studies of OHM impact and remediation in wetlands will be covered, and time will be included for questions. This is an important workshop for commissioners and consultants at all levels of experience.

Speaker: Paul J. McManus, LSP, PWS, President, EcoTec, Inc.

D7 Educating the Next Generation of Environmental Professionals: Bristol County Agricultural School

The Bristol County Agricultural School is a public, vocational/technical high school located in Dighton, Massachusetts. Preferring real-world, student engagement and cooperative efforts with other institutions and agencies, the Environmental Conservation Department (ECD) currently offers conservation science curricula like no others in New England. Current and recent partners include the US Fish and Wildlife Service, Massachusetts Division of Fisheries & Wildlife, New Jersey Division of Fish & Wildlife, Savannah River Ecology Laboratory, Roger Williams Park Zoo, Oxbow Associates, Hofstra University, The Turtle Survival Alliance, and the Marine Biological Laboratory of Woods Hole. The Bristol Aggie ECD offers the Natural Resources Management (NRM) and Environmental Engineering (EE) programs of study. While overlap exists, each program offers unique courses and learning opportunities. Learn about the Bristol Aggie program, partnership opportunities, and how to engage young people to become our future leaders in environmental conservation.

Speaker: Brian Bastarache, Chair, Environmental Conservation Department, Bristol County Agricultural High School

D8 Wetlands Protection Act (WPA) 101 Trivia with the MassDEP Circuit Riders

Please join MassDEP's Central and Northeast Circuit Riders, Mia McDonald and Alicia Geilen, for a fun hour of in person trivia, based on the Massachusetts Wetlands Protection Act and Regulations. Questions are designed to test your knowledge and include several common misconceptions to stump contestants. Participants may track their own progress or join in via Microsoft Teams to take part in the group results. Prizes will be awarded for all levels of expertise: from "Participation" and "Almost an Expert" to the highly coveted "World's Best Regulator". Hot tip: Participants should study 310 CMR 10.02, 10.04, and 10.05, and be ready to dominate!

Speakers: Mia McDonald, Circuit Rider/Environmental Analyst, Central Region, MassDEP Wetlands Program
Alicia Geilen, Circuit Rider, Northeast Region, MassDEP Wetlands Program

Fundamentals for Conservation Commissioners

9:45 a.m. – 12:15 p.m.

Unit 201: Getting Home Before Midnight: How to Run an Effective Meeting

Many commissions across Massachusetts are struggling due to frequent turnover in commission members and staff, plus an influx of new, less experienced commissioners. There is also an increasing inability to reach a quorum, as well as dealing with challenging individuals and lack of respect from municipal leaders. Understanding the regulations is challenging enough, but then the meetings and hearings must be held, and you hope to get home before midnight after the commission meetings. Join MACC's experienced instructors for this in-person class using a mock commission meeting with class participation. This is a fun and rewarding class where you can learn what to do when everything seems to go wrong. Bring your "burning" questions for our experienced instructors. This is an important class for all new commissioners as well as experienced commissioners and agents. This class is given in two parts in the morning, with a scheduled break in between.

Instructor: Nathaniel Stevens, Esq., Senior Associate, McGregor & Legere, P.C.; Chair, Arlington Conservation Commission; MACC Director

Assistant: Adrienne Lennon, Senior Ecologist, BSC Group; MACC Awards Committee Member

1:30 p.m. - 4:00 p.m.

Unit 103: Plan Review and Site Visit Procedures

This required Fundamentals Unit will provide participants with an understanding of how to read maps and engineering plans typically submitted to conservation commissions. The class provides an understanding and overview of site visits, how to prepare for and conduct site visits as a commissioner, as well as understanding wetland lines, erosion and sediment control structures, and other symbols on engineering plans. This is a great class for new commissioners as well as consultants, and participants will learn by using large construction plans.

Instructor: Tennis Lilly, Climate Resiliency Program Manager; Chair, Lawrence Conservation Commission ; MACC Education Committee Member

Assistant: Moses Matovu, Project Designer, Nitsch Engineering

Fwd: Science Fair Judging 2024 - Time change. Judging 1:30 - 3:30

Eve Wittenberg <ewittenberg01451@gmail.com>

Mon 01/22/24 3:56 PM

To:Liz Allard <lallard@harvard-ma.gov>

Just FYI.

Begin forwarded message:

From: Ellen Leicher <esachsleicher@gmail.com>**Date:** January 22, 2024 at 3:55:03 PM EST**To:** Bruce <bruceleicher@aol.com>, Eve Wittenberg <ewittenberg01451@gmail.com>, Gina Ashe <ginaashe1@gmail.com>, Forrest Hodgkins <forresthodgkins@gmail.com>, dan@athletesedge.com, rlatzman@gmail.com, Abigail Besse <abbybesse@yahoo.com>, Dana Katter Oliver <danakoliver@gmail.com>, Terry Symula <terrysymula@gmail.com>, jkboynton@gmail.com, lbwallace34@aol.com, nbrowse@earthlink.net, starleen@charter.net, Bruce Blain <bruce.blain@charter.net>, Suzanne Hays <sghays@gmail.com>, staceyc@nashuariverwatershed.org**Subject: Re: Science Fair Judging 2024 - Time change. Judging 1:30 - 3:30**

A quick update. I just received information from the Bromfield Science Department - The Science Fair judging on Wed, March 20 is now 1:30 - 3:30. Awards are at 7 - 8 pm

Ellen Sachs Leicher
esachsleicher@gmail.com
508-572-4002 (cell)
978-456-8151 (land line)

On Jan 22, 2024, at 10:13 AM, Ellen Leicher <esachsleicher@gmail.com> wrote:

Hi All,

Planning for Science Fair has started and I am reaching out to all of you whose organizations/committees/boards judged and gave awards in the past. In some cases I am reaching out to multiple folks from the same organization knowing there has been changes in leadership and membership. Below is the list of who I have for each.

The date of the fair this year is Wednesday, March 20 at 2 pm. Awards ceremony is usually 7 pm. Note that this is midweek rather than the usual Friday afternoon.

Grades 8 - 12 participate in the Science Fair.

Please let me know the following:

Will you be participating in the Science Fair Judging and Awards?

Who should be the contact person going forward? (I send several organizing emails and instructions to prepare for the day)

Am I missing any organization/committee/board?

Please get back to me by February 1st.

List of Past Participants:

Astronomers of the Future - Eileen Myers

Bare Hill Pond - Bruce Leicher

Harvard Cable Committee - Nick Browse

Harvard Climate Initiative - me

Harvard Conservation Commission - Eve Wittenberg

Harvard Conservation Trust - Gina Ashe, Abbe Alpert

Harvard Energy Advisory Committee - Forrest Hodgkins

Harvard Garden Club - Margaret Murphy, Jessie Panek

Harvard Lions Club - Kent Boynton

Harvard PTO - Dana Oliver, Rob Latzman

Harvard School Committee - Abby Besse

Harvard Schools Trust - Terry Symula

Nashoba Valley Amateur Radio Club - Bruce Blain

Nashua River Watershed Association- Lucy Wallace, Front Desk rep

Ellen Sachs Leicher

esachsleicher@gmail.com

508-572-4002 (cell)

978-456-8151 (land line)

January 12, 2024
5779

Harvard Zoning Board of Appeals
c/o Christopher Tracey, Chair
13 Ayer Road
Harvard, MA 01451

VIA EMAIL

RE: As-Built Review
“Craftsman Village Harvard”
361 Ayer Road, Harvard MA

Dear Members of the Board:

Dillis & Roy Civil Design Group, Inc. (CDG) has received the As-built plans and supporting letter for Craftsman Village. We have reviewed the plans and supporting documents for accuracy with respect to visible site features.

The following documents were received by CDG:

1. Letter dated November 30, 2023 prepared by Hannigan Engineering, Inc
2. As-Built Plan dated November 29, 2023 prepared by Hannigan Engineering, Inc.

DR conducted a site visit on January 3, 2024 with Frank O’Connor (Town Planner), Liz Allard (Conservation Agent), and Chris Anderson (Hannigan Engineering). The plans by Hannigan accurately represent the As-Built Condition for the project site. There are several items however that should be addressed by the Applicant during the next growing season, which are listed below:

- Provide stone drip edges around units without gutters of sufficient width to prevent erosion around the units;
- Regrade and hydroseed trailer area on south side of Cortland Lane;
- Regrade and hydroseed grassed area along south side of Cortland Lane to provide positive, stable drainage to existing DCB-3;
- Provide additional rip-rap reinforcement at 24-inch flared end structure discharge from DMH-6;
- Restore grassed slope with hydroseed behind Units 15 through 17;
- Hydroseed disturbed area in existing rain garden and supplement existing plantings to meet planting requirements of originally permitted Rain Garden Cross-Section (Detail 1 Plan C-6).

Based on our review, it is our opinion that the work depicted on the As-built plan has been constructed in general conformance with the approved plans for the project, and that the above noted items can be easily addressed during the next growing season. We trust this meets your needs at this time. If you have any questions or require any additional information, please do not hesitate to contact me.

Regards,

DILLIS & ROY
CIVIL DESIGN GROUP, INC.

A handwritten signature in black ink, appearing to read "Francis McPartlan". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Francis McPartlan, PE (MA)
Senior Civil Engineer



October 13, 2023

Harvard Conservation Commission
Town Hall
13 Ayer Road
Harvard, MA 01451
lallard@harvard-ma.gov

VIA EMAIL ONLY

Tel 978-456-4100 ext. 321

**Re: Invasive Plant Control Plan
Craftsman Village Harvard LLC
Harvard, MA**

[DEP File #177-0678]

Dear Members of the Commission:

Oxbow Associates, Inc. (OA) has prepared this Invasive Plant Control Plan for the above project for review by the Harvard Conservation Commission. Scott Smyers is a Senior Scientist and Licensed Pesticide/Herbicide Applicator in Massachusetts (AL-0050645). OA is insured and regularly works with local Conservation Commissions, private landowners, and Land Trusts to control invasive or nuisance plants. Control of invasive plants is best achieved using various methods implemented strategically over consecutive seasons. OA's plan considers the requirements of the Order of Conditions (issued July 3, 2019) and the letter from Caron Environmental (September 7, 2023) and proposes two treatments each summer (August-September) for three seasons (2024-2026).

Under this plan, OA will selectively apply herbicides using foliar spray and cut/stump (wipe/apply) of invasive plants including Japanese knotweed (*Fallopia japonica*), bittersweet (*Celastrus orbiculatus*), European buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), burning bush (*Euonymus alatus*), and multiflora rose (*Rosa multiflora*). During OA's annual treatments, we will inspect the landscaped portions of the property for invasive plants (including beyond the buffer zone) but we expect regular mowing of the lawn will reduce invasives throughout landscape. OA will also rely on the current facilities/maintenance staff to be aware of and report any invasive plants to OA.

Selective Herbicide Application and GPS Mapping

The proposed treatment area includes the detention basin and all the geographic area within the buffer zone from the westernmost well to the eastern property line and approximately 25 feet into the wetland. This does not include any areas outside the buffer zone. All the work is limited to the subject property.

No foliar application (backpack sprayer) is proposed within 25 feet of any standing or flowing water. Each season, OA will conduct approximately two, half days, approximately 5 field-hours of

selective herbicide treatment using a combination of backpack sprayer and stem-applicator with glyphosate-based herbicide (Lesco Prosecutor Pro) for Japanese knotweed and triclopyr-based herbicide (Lesco 4 Ester) for broadleaf vines and shrubs. A stem-applicator with straight glyphosate will be used for cut/stem. OA will use clippers, handsaw, electric chainsaw, appropriate PPE, and GPS to identify the outline of our work areas.

Annual Report and GIS Map

After the work is complete, OA will provide a brief report for the Conservation Commission. The report will include details of the site conditions, work completed, recommendations, and a GIS figure.

Exclusions and Regulatory Summary

This plan does not include any work on neighboring properties or beyond the jurisdiction of the Conservation Commission. However, the same methods proposed above could likely be applied in cooperation with neighboring landowners with permission from appropriate regulatory authorities.

In OA's opinion, this work is **very unlikely to directly or indirectly negatively impact** any wetland resource area and **will result in a net benefit to the biodiversity of the Buffer Zone**, thus after implementation will bring the project into compliance with the Order of Conditions.

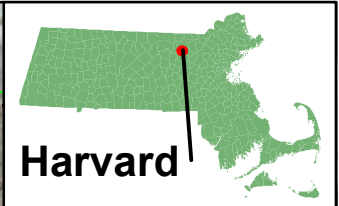
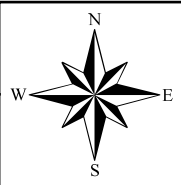
Please contact me If the Commission has any questions.

Sincerely,



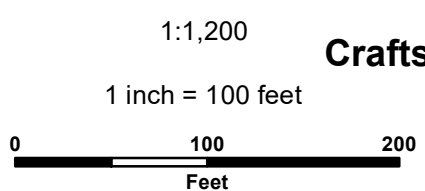
Scott Smyers
Senior Scientist, Vice President
MS PWS

cc: Mark O'Hagan, Craftsman Village LLC
Chuck Caron, Caron Environmental



Legend

- Wetland Line
- ▭ Property Line
- ▨ Treatment Area



2021 Orthophotograph
Craftsman Village Invasive Control
Ayer Road
Harvard, MA
December 28, 2023

**HARVARD CONSERVATION COMMISSION
MINUTES OF MEETING
OCTOBER 5, 2023**

Chair Eve Wittenberg called the meeting to order at 7:05pm, virtually, pursuant to Chapter 2 of the Acts of 2023, An Act Relative to Extending Certain COVID-19 measures adopted during the State of Emergency, and signed into law on March 29, 2023, under MGL Chapter 131 §40 Wetland Protection Act and Code of the Town of Harvard Chapter 119 Wetland Protection Bylaw

Members Present: Eve Wittenberg, Jaye Waldron, Joanne Ward (departed at 7:38pm), Mark Shaw, Jessie Panek and John Lee (Associate Member)

Others Present: Liz Allard (Conservation Agent), Chuck Caron, Mark O’Hagan, Seth Donohoe (Dillis & Roy Civil Design Group), John Hunt, Luke Kirkland, Dan Wolfe (Ross Associates, Inc.) and Constance Larrabee

Review Craftsman Village Harvard Plan to Manage Invasive Plants

Mark O’Hagan provided an overview of the project to date, including an as-built being put together for review by the Zoning Board of Appeals consultant for the release of the final unit within the development. Mr. O’Hagan understands the Commission would be seeking a full growing season before issuing the Certificate of Compliance. Mr. O’Hagan is requesting a release from the Commission as far as the last unit is concerned.

In regards to the condition for an invasive management plan within the northeast corner of the site per the Order of Conditions, Chuck Caron stated Japanese Knotweed is the predominate invasive, with some bittersweet and glossy buckthorn. Mr. Carron stated signs of these invasives were seen within the lawn areas, detention basin, access driveway to the well, along with the rain garden. Mr. Carron suggested with invasives in the northeast corner going off site into Ayer requiring heavy treatment and the control of the invasive within the existing disturbed areas on the site would serve the site better. Scott Smyer, a licensed applicator from of Oxbow Associates, has been consulted and agrees the detention basin and rain garden can be controlled with the use of herbicides; the lawn areas can be maintained by mowing routinely.

Jessie Panek requested a map of the affected areas be provided as well. Ms. Panek understands the fruitfulness of treating the northeast corner of the site. The wetland buffer zone in the area of proposed management is with the 60 to 100-foot buffer zone. Ms. Panek feels two grow season seems unrealistic and would ask these management practices continue in perpetual. For clarification it was stated the rain garden basin is the area that will need the application, whereas the other detention basin would only need to be mowed. The gravel path to wells may need treatment as well. Eve Wittenberg asked for Oxbow Associates to prepare a detailed report and map for the Commission’s review.

Continuation of a Notice of Intent Hearing - Rachel Broadhurst, 41 Pinnacle Road, DEP#177-728, Harvard#0823-03. Opened at 7:34pm

Deer Management Subcommittee Request to Increase the Number of Approved Hunters for the 2023 Season

Jessie Panek made a motion increased the number of permitted hunters from 19 to 24 for the 2023 hunting season. Mark Shaw seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Mark Shaw, aye; Jessie Panek, aye; and Eve Wittenberg, aye.

Review Peer Review Proposal from Beals + Thomas for The Village at Robin Lane, Ayer & Old Mill Roads

Jaye Waldron made a motion to accept the proposal for Peer Review of the Notice of Intent for The Village at Robin Lane as provided by Beals + Thomas, dated September 29, 2023 in the amount of \$6,600.

53 Jessie Panek seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye
54 Waldron, aye; Mark Shaw, aye; Jessie Panek, aye; and Eve Wittenberg, aye.

55
56 **Continuation of a Notice of Intent Hearing – Juno Construction LLC, Ayer & Old Mill Roads, (Map 4**
57 **Parcels 52, 52.1, 52.2 & 53), Harvard#0923-01.** Opened at 7:45pm

58
59 **Updates from Land Stewardship and Deer Management Subcommittees from the Liaisons**

60 Jesie Panek stated the deer hunting season by bow has begun for the season with one deer harvested on
61 the first day. Ms. Panek explained some of the approved parcels have two or three hunters; most have
62 just one. There has been one incident where a neighbor called the police, however, all was good when
63 police arrived as the hunter had all appropriate notification.

64
65 Liz Allard provided an update for Jim Burns on the Land Stewardship Subcommittee, which includes
66 drafting a recommended policy on memorial benches and joining with Harvard Conservation Trust on trail
67 upkeep.

68
69 **Continuation of a Notice of Intent Hearing - John & Laura Hunt, 61 Stow Road, Harvard#0823-04.**

70 Opened at 8:00pm

71
72 **Continuation of Abbreviated Notices of Intent Hearing – Harvard Conservation Commission, Mass Ave**
73 **(Map 23 Parcel 35) and Stow Road (Map 32 Parcel 55), Harvard#0823-01 & 02.** Opened at 8:25pm

74
75 **Notice of Intent Hearing – Constance Larabee, 15 Under Pin Hill Road, Harvard#0923-02.** Opened at
76 8:27pm

77
78 **MACC Fall Conference Registration for Workshops on October 28, 2023**

79 Invoices generated from members registration can be forwarded to Liz Allard for inclusion on the next bill
80 warrant.

81
82 **Approve Minutes**

83 Jaye Waldron made a motion to approve the minutes of August 17, 2023 as amended. Mark Shaw
84 seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye;
85 Mark Shaw, aye; Jessie Panek, aye and Eve Wittenberg.

86
87 **Update on Enforcement Order – 320 Ayer Road**

88 GPR, Inc. anticipates submitting a Notice of Intent for the first meeting in November.

89
90 **Assign Timeframes to assigned tasks from Strategic Planning Session**

91 Members were requested to provide suitable timeframes for discussion at the next meeting.

92
93 **Update on Proposed Park at Beaver Brook, Boxborough**

94 With Joanne Ward's early departure from the meeting this item was passed over.

95
96 **Pine Hill Village Status Update, DEP#177-586**

97 Liz Allard reviewed the site today where work is proceeding on Phase 3, including the septic system. The
98 siltation barrier is holding up well despite all work being uphill from the wetland and is holding back a lot
99 more water than anticipated due to the deluge of rain as of late.

100
101 **Update on 90 Warren Ave, DEP#177-719, Harvard#1122-02**

102 Liz Allard reviewed the site today where the dwelling is in the framing stage. The septic system has been
103 installed and stabilized. Ms. Allard double checked the foundation perimeter drain as to where is
104 daylighting for silt accumulation; the addition of more rip rap has improved that situation, which will not
105 occur once site is stabilized.

106 **Schedule Site Visit for Unauthorized Trail on Rodriguez Land (Map 13 Parcels 3.2 & 4)**
107 The Land Stewardship Subcommittee (LSS) has reviewed the proposed trail location on the Rodriguez land
108 and is suggesting the trail route would be better suited on the Shaw land within the area in which Harvard
109 Conservation Trust (HCT) hold a conservation restriction (CR). LSS has suggested Tony Shaw speak with
110 HCT about amending the CR to allow that trail before the Commission spends time on this matter. John
111 Lee, a member of the HCT has not heard from Mr. Shaw on that matter as of yet.

112
113 **Adjournment**
114 Mark Shaw made a motion to adjourn the meeting at 9:01pm. Jessie Panek seconded the motion. The
115 vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Mark Shaw, aye; and Jessie
116 Panek, aye; and Eve Wittenberg, aye.

117
118 Respectfully submitted,
119
120
121 Liz Allard,
122 Conservation Agent

EXHIBITS & OTHER DOCUMENTS

- Conservation Commission Agenda, dated October 5, 2023
- NOI Site Plan 61 Stow Road Harvard, Massachusetts, owner John & Laura Hunt, Job No. 4608, prepared by Dillis & Roy Civil Design Group, 7/17/2023
- Sewage Disposal System 15 Under Pin Hill Road Harvard, Massachusetts, designed for Constance Larrabee, Job No.: 24008, Plan No.: L-10430, dated 9/07/23

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Harvard Conservation Commission
Continuation of a Notice of Intent Hearing Meeting Minutes
Rachel Broadhurst, 41 Pinnacle Road, DEP#177-728, Harvard#0823-03
October 5, 2023

The public hearing was opened at 7:34pm by Chair Eve Wittenberg under MGL Chapter 131 §40 Wetland Protection Act and the Code of the Town of Harvard Chapter 119 Wetland Protection Bylaw virtually, pursuant to Chapter 2 of the Acts of 2023, An Act Relative to Extending Certain COVID-19 measures adopted during the State of Emergency, and signed into law on March 29, 2023.

Members Present: Eve Wittenberg, Jaye Waldron, Joanne Ward, Mark Shaw, Jessie Panek and John Lee (Associate Member)

Others Present: Liz Allard (Conservation Agent)

This hearing was continued from September 7, 2023 for a Notice of Intent filed on behalf of Rachel Broadhurst for the construction of a paddock within 100' of a wetland resource area and the restoration of the resource area after enforcement at 41 Pinnacle Road, Harvard.

At the request of the applicant's representative, Jessie Panek made a motion to continue the hearing to October 19, 2023 at 7:30pm. Jaye seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Joanne Ward, aye; Mark Shaw, aye; and Jessie Panek, aye.

Respectfully submitted,

Liz Allard,
Conservation Agent

Harvard Conservation Commission
Continuation of a Notice of Intent Hearing Meeting Minutes
Juno Construction LLC, Ayer & Old Mill Roads,
(Map 4 Parcels 52, 52.1, 52.2 & 53), Harvard#0923-01
October 5, 2023

The public hearing was opened at 7:45pm by Chair Eve Wittenberg under MGL Chapter 131 §40 Wetland Protection Act and the Code of the Town of Harvard Chapter 119 Wetland Protection Bylaw virtually, pursuant to Chapter 2 of the Acts of 2023, An Act Relative to Extending Certain COVID-19 Measures Adopted during the State of Emergency, and signed into law on March 29, 2023.

Members Present: Eve Wittenberg, Jaye Waldron, Mark Shaw, Jessie Panek and John Lee (Associate Member)

Others Present: Liz Allard (Conservation Agent)

This hearing was continued from September 14, 2023 for a Notice of Intent filed on behalf of Juno Construction LLC, for the construction of one duplex unit, deck, drainage, public water supply wells, tree clearing, grading and associated utilities within the 100' wetland buffer zone and the 200' riverfront area at Ayer & Old Mill Roads, (Map 4 Parcels 52, 52.1, 52.2 & 53), Harvard

At the request of the applicant's representative Mark Shaw made a motion to continue to November 2, 2023 at 7:30pm. Jaye Waldron seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Mark Shaw, aye; Jessie Panek, aye; and Eve Wittenberg, aye.

Respectfully submitted,

Liz Allard,
Conservation Agent

Harvard Conservation Commission
Continuation of a Notice of Intent Hearing Meeting Minutes
John & Laura Hunt, 61 Stow Road, DEP#177-730, Harvard#0823-04
October 5, 2023

The public hearing was opened at 8:00pm by Chair Eve Wittenberg under MGL Chapter 131 §40 Wetland Protection Act and the Code of the Town of Harvard Chapter 119 Wetland Protection Bylaw virtually, pursuant to Chapter 2 of the Acts of 2023, An Act Relative to Extending Certain COVID-19 measures adopted during the State of Emergency, and signed into law on March 29, 2023.

Members Present: Eve Wittenberg, Jaye Waldron, Mark Shaw, Jessie Panek and John Lee (Associate Member)

Others Present: Liz Allard (Conservation Agent), Seth Donohoe (Dillis & Roy Civil Design Group) and John Hunt

This hearing was continued from September 14, 2023 for a Notice of Intent filed on behalf of John & Laura Hunt for the addition of deck, porch, and patio to an existing single-family dwelling within the 200' riverfront area at 61 Stow Road, Harvard.

Seth Donohoe, of Dillis & Roy Civil Design Group, reviewed the proposed project, which the Commission had no issues with previously. However, the site walk brought other issues to light. Mr. Donohoe requested the Commission close the hearing and issue an Order of Conditions in for the applicant to move forward with the project.

In the addition to the Commission seeking additional vegetated buffer along the stream, John Hunt was requesting to include the removal and replanting of the overgrowth along Stow Road within this application. Mr. Hunt suggested the area would be replant with species that are consistent with the property. The area in question, about four to five feet off the stone wall, and would be incorporate the annual mowing along with the lower field. Eve Wittenberg asked how it is related to the 200' riverfront area. Mr. Donohoe stated the 200' RFA transects a portion of the rear of the house. Jaye Waldron stated the Commission cannot approve activity that is not detailed on a plan before them. Mr. Donohoe stated the plan does not show the entire area in question nor what is to be conducted in that area. After trying to accomidate Mr. Hunt's request Liz Allard suggested the Notice of Intent narrative be revised to include this work and update the plan to detail the activity. Mr. Donohoe would amend the plan and narrative as suggested.

In regards to the Commission's request to increase the vegetated buffer along the stream, Jessie Panek stated she would like some vegetated buffer area taken from the lawn area that would be allowed to grow up in the summer that can be mowed annually; something better for the lawn to filter the stream water in heavy rains that would provide a vegetated buffer of natural vegetation, approximately ten-feet in the area adjacent to the bridge. Mr. Hunt was agreeable to determining the exact area with the Conservation Agent that addresses the Commission's concerns.

Jaye Waldron made a motion to close the hearing and issue an Order of Conditions with the submission of a revised plan that shows the area of invasive management, an agreed length, between the property owner and the Conservation Agent, to be left in natural state along the stream and updated Notice of Intent narrative. Jessie Panek seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Mark Shaw, aye; Jessie Panek, aye; Eve Wittenberg, aye.

Respectfully submitted, Liz Allard,
Conservation Agent

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Harvard Conservation Commission
Continuation of Abbreviated Notices of Intent Hearing
Harvard Conservation Commission,
Mass Ave (Map 23 Parcel 35) and Stow Road (Map 32 Parcel 55)
DEP#177-731 & 732, Harvard#0823-01 & 02
October 5, 2023

The public hearing was opened at 8:25pm by Chair Eve Wittenberg under MGL Chapter 131 §40 Wetland Protection Act and the Code of the Town of Harvard Chapter 119 Wetland Protection Bylaw virtually, pursuant to Chapter 2 of the Acts of 2023, An Act Relative to Extending Certain COVID-19 measures adopted during the State of Emergency, and signed into law on March 29, 2023.

Members Present: Eve Wittenberg, Jaye Waldron, Joanne Ward, Jim Burns, Mark Shaw, Jessie Panek and John Lee (Associate Member)

Others Present: Liz Allard (Conservation Agent)

This hearing was continued from September 14, 2023 for two Abbreviated Notices of Intent filed by the Harvard Conservation Commission for the management of invasive plant species within wetland resource areas and their associated buffer zone on Mass Ave (Map 23 Parcel 35) and Stow Road (Map 32 Parcel 55), Harvard

Liz Allard explained the comments received from the Department of Environmental Protection (DEP) along with the appropriate file numbers was ensuring the treatment area was quantified within the applications, which she will complete and resubmitted to DEP. Jessie Panek made a motion to close the hearing and issue standard Orders of Conditions. Jaye Waldron seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Mark Shaw, aye; Jessie Panek, aye: and Eve Wittenberg, aye.

Respectfully submitted,

Liz Allard,
Conservation Agent

**Harvard Conservation Commission
Notice of Intent Hearing Meeting Minutes
Constance Larrabee, 15 Under Pin Hill Road,
DEP#177-734, Harvard#0923-02
October 5, 2023**

The public hearing was opened at 8:27pm by Chair Eve Wittenberg under MGL Chapter 131 §40 Wetland Protection Act and the Code of the Town of Harvard Chapter 119 Wetland Protection Bylaw virtually, pursuant to Chapter 2 of the Acts of 2023, An Act Relative to Extending Certain COVID-19 measures adopted during the State of Emergency, and signed into law on March 29, 2023.

Members Present: Eve Wittenberg, Jaye Waldron, Mark Shaw, Jessie Panek and John Lee (Associate Member)

Others Present: Liz Allard (Conservation Agent), Dan Wolfe (Ross Associates, Inc.) and Constance Larrabee

This hearing is for a Notice of Intent filed on behalf of, Constance Larrabee for the upgrade of a sewage disposal system within the 100' wetland buffer zone at 15 Under Pin Hill Road, Harvard.

Dan Wolfe, of Ross Associates, Inc., stated a large portion of the lot is encumbered by the well and wetlands to the rear and across the street, dictated where the septic system can be installed. The new Perby© system will be within the same general area as the existing system and will require some raising of the driveway. The raising of the driveway will provide for a better exit out of the driveway onto Under Pin Hill Road. A proper siltation barrier has been detailed on the plan. The members conducted a site walk earlier this week which assisted in addressing any concerns they had.

Jessie Panek made a motion to close the hearing and issue an Order of Conditions with the standard special conditions. Jaye Waldron seconded the motion. The vote was unanimously in favor of the motion by a roll call, Jaye Waldron, aye; Mark Shaw, aye; and Jessie Panek, aye and Eve Wittenberg, aye.

Respectfully submitted,

Liz Allard,
Conservation Agent